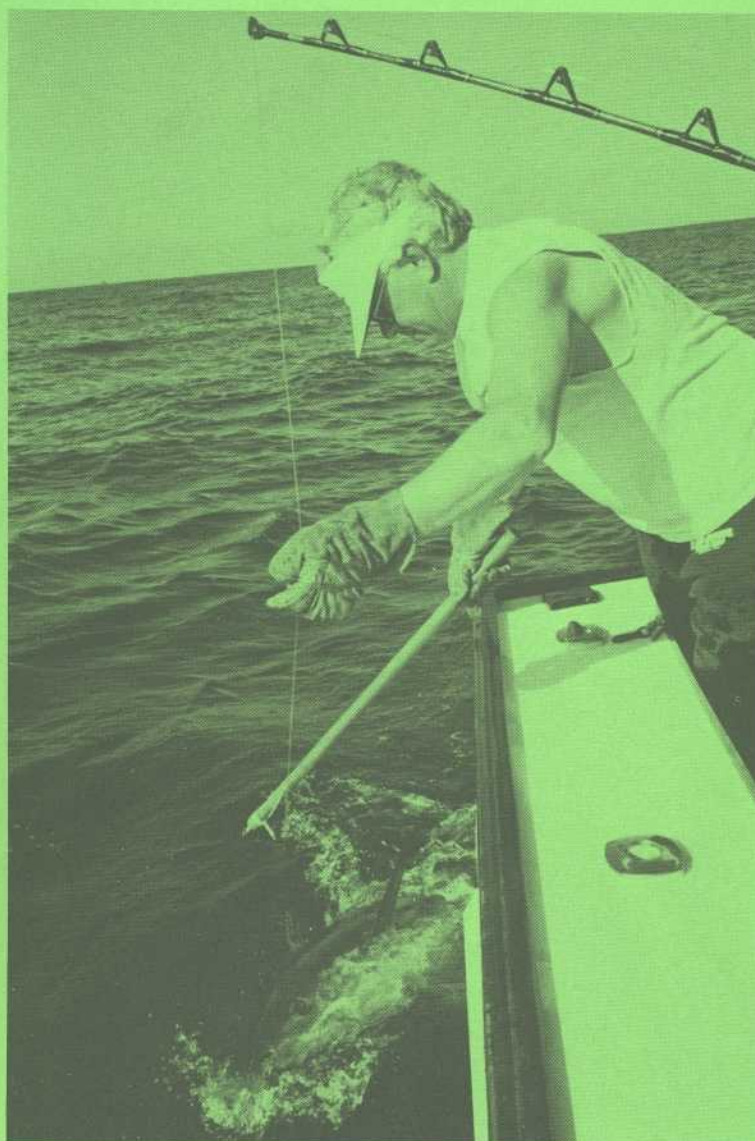




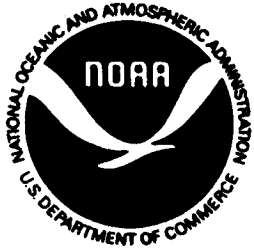
COOPERATIVE TAGGING CENTER ANNUAL NEWSLETTER: 1993



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and Eric D. Prince**

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April 1995



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by

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and Eric D. Prince**

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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NATIONAL MARINE FISHERIES SERVICE
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April 1995

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Cover Photo:

Bob Eakes of Buxton, North Carolina, demonstrates a dual applicator tagging pole on Atlantic bluefin tuna.

Cooperative Tagging Center

The National Marine Fisheries Service's (NMFS) Southeast Fisheries Science Center (SEFSC) formed the Cooperative Tagging Center (CTC) in 1992 in response to the recent expansion of tag release and recapture activities, data requests from other tagging agencies, and domestic and international tagging research needs. The CTC encompasses a variety of functions and responsibilities. The CTC also includes the Cooperative Tagging System (CTS), as well as other research projects such as tag development and tag performance research. While the NMFS tagging is the main subject of this newsletter, other tagging activities within or related to the CTC are also presented in this report.

Cooperative Tagging Center—1993 Activities

The Cooperative Tagging Center (CTC) is a joint research effort by scientists and recreational and commercial fishermen. It is designed to provide information on the movements and biology of marine fish species in the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea through the direct participation of the public in scientific research.

The CTC began in 1954 as the Cooperative Gamefish Tagging Program, with its focus on the tagging of bluefin tuna. Almost immediately, in response to growing concerns about other highly migratory species, the program expanded to encompass billfishes — marlins, sailfish, and spearfish. As time went by, and exploitation affected a larger number of fisheries, other species of fish were added to the program. At the same time, public awareness of over-exploitation of fisheries increased and the attitude toward tagging programs began to gain popularity. In recent years, the adoption of certain fisheries regulations, such as minimum size limits, have contributed towards the willingness of the public to participate in non-consumptive fisheries that include tag-release and recapture programs. Today, between 10,000-20,000 participants contribute to the program, from virtually every segment of both the recreational and commercial fishing communities.

Growth of the tagging program in terms of total numbers of fish released and recaptured has been exceptional in the last few years (Figures 1 & 2). For example, about 11,000 fish of 47 species were tagged and released in 1990, 16,000 fish of 61 species were tagged in 1991 and almost 20,000 fish of 76 species were tagged and released in 1992. In 1993, about 16,500 fish were tagged and released. This small decrease was due primarily due to a temporary shortage of tagging equipment and was not related the number of participants in the program.

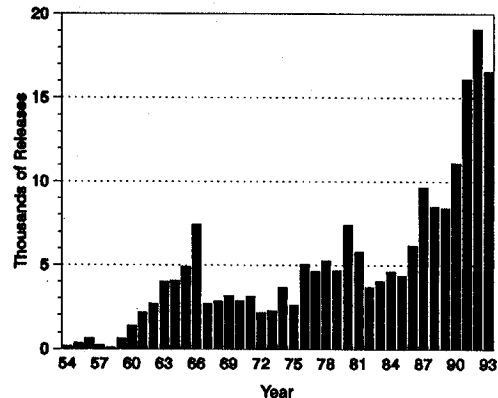


Figure 1. Number of fish tagged per year by scientists and cooperators of the Cooperative Tagging Center, 1954 to 1993.

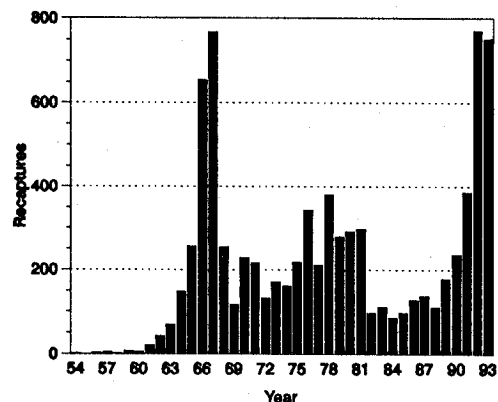


Figure 2. Number of fish recaptured per year by scientists and cooperators of the Cooperative Tagging Center, 1954 to 1993.

Sailfish

A total of 2,861 sailfish were tagged and released in 1993, 2,768 by recreational fishermen, 66 by commercial fishermen, and 27 by scientific staff. As in previous years, a majority of sailfish taggings (1,411) took place off the southeast coast of Florida. Other areas where large numbers of sailfish were tagged include: Cancun/Cozumel, Mexico (859), and off the north Florida and the Carolinas coasts (167). Program cooperators also tagged sailfish in La Guaira, Venezuela, the northern Bahamas, off southern Texas, and the U.S. Virgin Islands.

There were 103 tagged sailfish recaptured in 1993, 93 by recreational fishermen, 9 by commercial fishermen, and in 3 cases the type of fisherman was not reported. The locations of 1993 sailfish recaptures are given in Table 1, and a graph showing the years at-large is presented in Figure 3. Since some recapture locations were not reported, tables summarizing release-recapture areas may contain fewer fish than the total number actually recaptured in 1993.

The longest straight-line distance traveled (a minimum estimate of movement which provides no

insight into the true route taken) by a sailfish recaptured in 1993 was 2,161 nautical miles (nm). This fish was tagged by a U.S. recreational fisherman off Cape Hatteras, NC, in August 1992, and recaptured by a longliner, off the coast of Surinam and French Guiana in July, 1993. The longest time at-large for a sailfish recaptured in 1993 was 3,373 days (9.2 years), for a fish released west of the Cayman Islands in April, 1984, and recaptured off the east coast of Cuba in July, 1993. Selected movements for 1993 release-recaptures are shown in Figure 4.

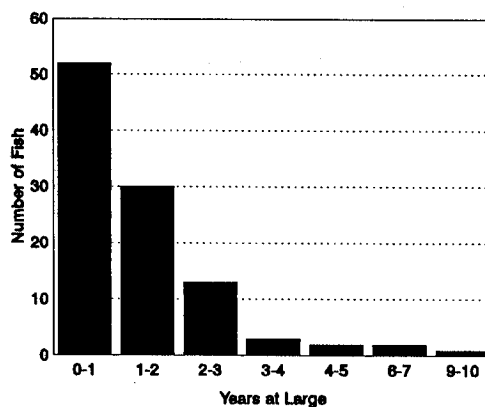


Figure 3. Years at-large for 1993 sailfish recaptures (N=103).

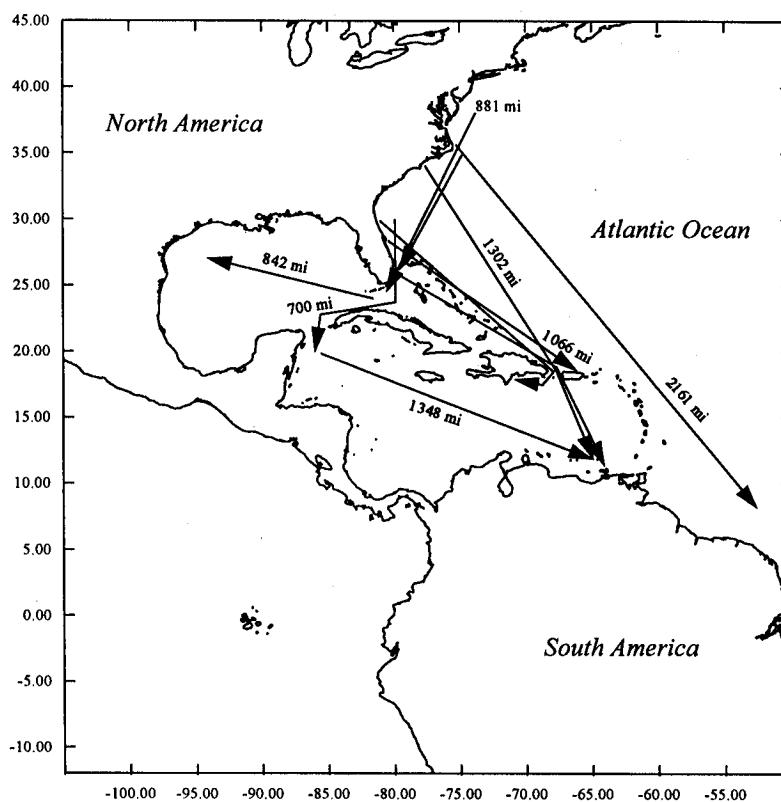


Figure 4. Movements of selected 1993 tag-recaptured sailfish.

Table 1. Release and recapture areas for sailfish recaptured in 1993.

<u>Release Area</u>	<u>Recapture Area</u>	<u>Total</u>
S.E. Florida	S.E. Florida	36
	Florida Keys	13
	Texas	2
	Cumana	1
Florida Keys	S.E. Florida	12
	Florida Keys	9
	E. Atlantic	1
Cancun/Cozumel	Cancun/Cozumel	6
	Cuban Waters	1
	S.E. Florida	1
	Venezuela	1
N. Florida	S.E. Florida	4
	Hispaniola	2
	Eastern U.S. coast	1
	Cozumel	1
	Puerto Rico	1
	Venezuela	1
La Guaira, Venezuela	La Guaira	2
	Cumana, Venezuela	1
Eastern U.S. coastal waters	W. Atlantic (offshore)	1
	S.E. Florida	1
	Fl. Keys	1
N. Bahamas	S.E. Florida	1
Total:		103

Blue Marlin

There were 1,679 tag-released blue marlin in 1993, 1,543 by recreational fishermen, 119 by commercial fishermen, and 17 by scientific staff. Most taggings took place in waters around Puerto Rico (where 339 blue marlin were tagged) and the U.S. Virgin Islands (331 were tagged). Other blue marlin tagging locations include: the northern Bahamas (181), mid-Atlantic Bight (144), and Louisiana (92). Blue marlin were also tagged and released in smaller numbers off north Florida and the Carolinas, Texas, Florida Panhandle, Hispaniola, La Guaira, and southeast Florida.

Thirteen tagged blue marlin were recaptured in 1993, 12 by recreational fishermen, and 1 by a commercial fisherman. The locations of the 1993 blue marlin recaptures are given in Table 2, and a graph showing

the years at-large is presented in Figure 5.

Table 2. Release and recapture areas for blue marlin recaptured in 1993.

<u>Release Area</u>	<u>Recapture Area</u>	<u>Total</u>
Virgin Islands	Virgin Islands	1
	Venezuela	1
	La Guaira	1
Puerto Rico	Hispaniola	1
	Cumana	1
La Guaira, Venezuela	La Guaira	1
	Barbados	1
Eastern U.S. coastal waters	N. Florida & Carolinas	1
East. Atl.	East. Atl.	1
Texas	Texas	1
Africa/West	Africa/West	1
Total:		11

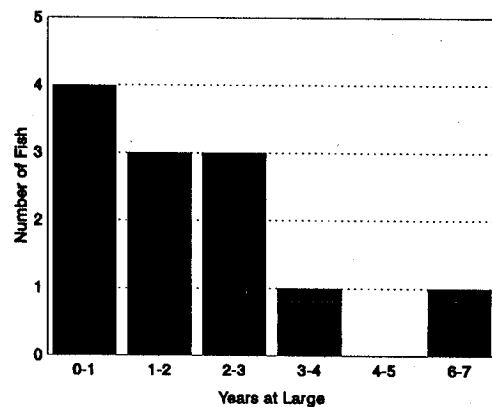


Figure 5. Years at-large for 1993 blue marlin recaptures (N=12).

As reported in the previous annual newsletter, there was a particularly interesting recapture in early 1993. A blue marlin, tagged with a South Carolina tagging program tag off Charleston in May, 1992, was recaptured about 500 miles east of Natal, Brazil, by a Japanese longliner in January, 1993. This was the first documented evidence of a blue marlin (or any billfish) making a transequatorial crossing.

The longest straight-line distance by a blue marlin recaptured in 1993 was estimated at 465 nm. This

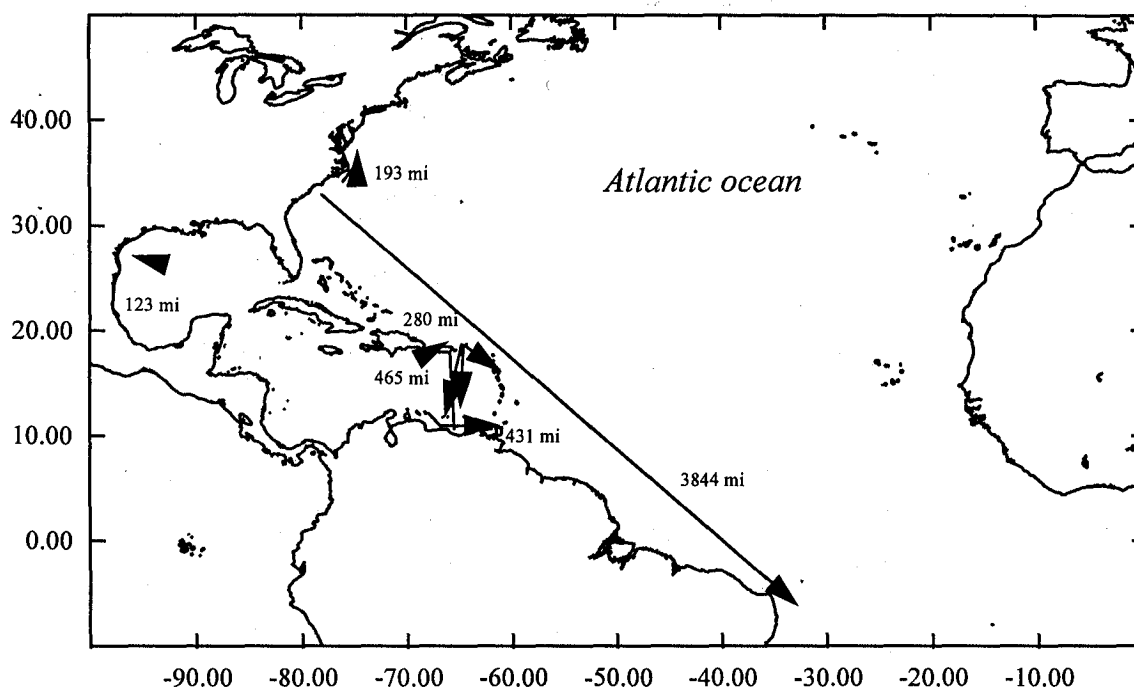


Figure 6. Movements of selected 1993 tag recaptured blue marlin.

fish was tagged and released off San Juan, Puerto Rico in May, 1991, by a recreational fisherman, and recaptured by a recreational fisherman off La Guaira, Venezuela in August, 1993. Selected movements for 1993 release-recaptures are shown in Figure 6. The longest time at-large for a 1993 blue marlin recapture was 2,231 days (6.1 years). This fish was released off Antigua (Leeward Islands) in September 1987, and recaptured off La Guaira in October, 1993.

White Marlin

In 1993, 1,461 white marlin were tagged and released, 1208 by recreational fishermen, 227 by commercial fishermen, and 26 by scientific staff. Most white marlin taggings were in two areas: the eastern U.S. coastal waters, where 726 were tagged; and off La Guaira, where 167 were tagged. White marlin were also tagged and released off the Florida Panhandle, Cozumel, north Florida, and Carolina waters.

Twenty-two tagged white marlin were recaptured in 1993, 16 by recreational fishermen, and 6 by commercial fishermen. The locations of 1993 white marlin recaptures are given in Table 3, and a graph showing the years at-large is presented in Figure 7.

The longest straight-line distance traveled by a white marlin recaptured in 1993, totaled 2,212 nm. This fish was tagged and released off Long Island, NY, in August 1992, by a recreational fisherman, and recaptured by a longliner off the coast of Guyana in July, 1993. Selected movements for 1993 recaptures are shown in Figure 8.

The longest time at-large for a white marlin recaptured in 1993 was 3,299 days (9.0 years), for a fish both tagged and recaptured off La Guaira, Venezuela. The release and recapture were both by recreational fishermen.

Table 3. Release and recapture areas for white marlin recaptured in 1993.

<u>Release Area</u>	<u>Recapture Area</u>	<u>Total</u>
Eastern U.S. coast	Eastern U.S. coast	6
	N.W. Atlantic (offshore)	2
	Cumana	2
	Fl. Keys	1
La Guaira	La Guaira	6
	Virgin Isl.	1
Gulf of Mexico	N. Bahamas	1
W. Atlantic (offshore)	Venezuela	1
N. Bahamas	Eastern U.S. coast	1
East. Atl.	East. Atl.	1
Total:		22

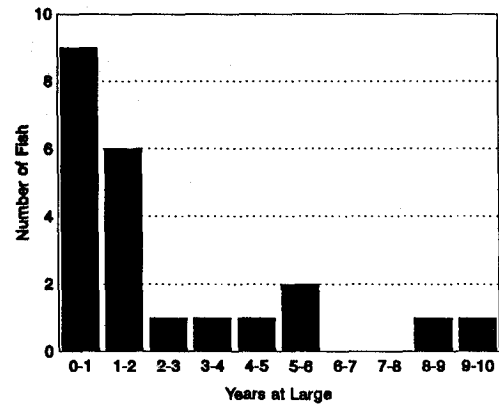


Figure 7. Years at-large for 1993 white marlin recaptures (N=22).

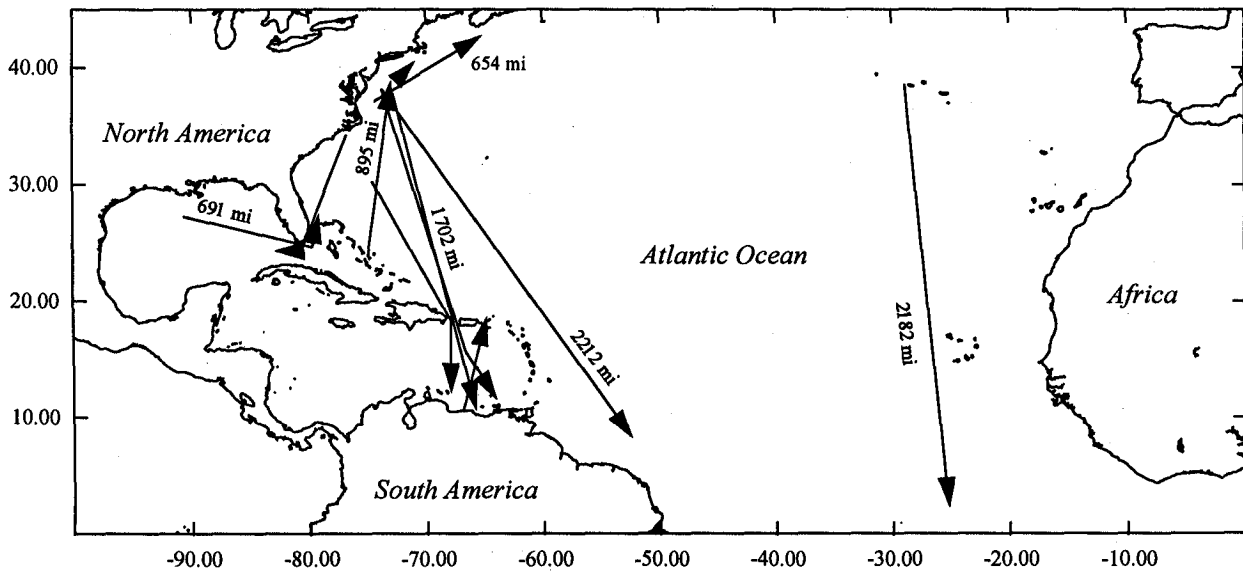


Figure 8. Movements of selected 1993 tag-recaptured white marlin.

Swordfish

There were 1,317 swordfish tagged and released in 1993, (1,219) were tagged by commercial fishermen, 83 by scientific staff, and 15 by recreational fishermen. Most of the swordfish tag-releases (390) were in the western north Atlantic, 324 were in the Gulf of Mexico, and 313 were in eastern U.S. coastal waters. A few swordfish were also tagged and released off north Florida and Carolinas, southeast Florida, northeast U.S., and Cancun.

Table 4. Release and recapture areas for swordfish recaptured in 1993.

Release Area	Recapture Area	Total
W. Atlantic (offshore)	W. Atlantic (offshore)	6
	Eastern U.S. coast	4
	Canada	2
	Virgin Isl.	1
	N.E. U.S.	1
	N. Florida & Carolinas	1
Eastern U.S. coastal waters	Eastern U.S. coast	5
	W. Atlantic (offshore)	3
	N. Florida & Carolinas	3
	Gulf of Mexico	1
	S.E. Florida	1
Gulf of Mexico	S.E. Florida	3
	W. Atlantic (offshore)	2
	Louisiana	1
	Texas	1
N.E. U.S.	Canada	1
	N. Florida & Carolinas	1
	S.E. Florida	1
		1
N. Florida & Carolinas	W. Atlantic (offshore)	1
	Eastern U.S. coast	1
	N. Florida & Carolinas	1
Fl. Keys	N. Florida & Carolinas	1
Total:		42

Forty two swordfish were recaptured in 1993, all by commercial fishermen. The locations of 1993 swordfish recaptures are given in Table 4, and a

graph showing the years at-large is presented in Figure 9.

The longest straight-line distance traveled by a 1993 tag-recaptured swordfish was 1,960 nm. This fish was released by a longliner off the coast of Newfoundland in September, 1993, and recaptured by a longliner only 99 days later, off San Juan, Puerto Rico. Selected movements for 1993 swordfish release-recaptures are shown in Figure 10.

The longest time at-large for a 1993 swordfish recapture was 2,057 days (5.6 years) by a fish tagged by a NMFS observer aboard a longliner over 300 miles off the New York coast in December, 1987, and recaptured by a harpoon fisherman 50 miles off the southern coast of Nova Scotia in July, 1993. This fish gained an estimated 241 pounds while at large. Unfortunately, no hardparts were saved from this fish for analysis and valuable information on age and growth were lost.

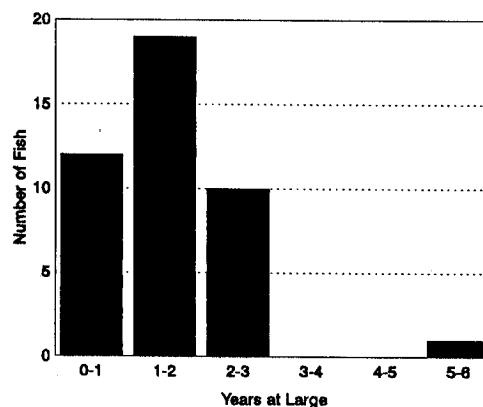


Figure 9. Years at-large for 1993 swordfish recaptures (N=42).

Bluefin Tuna

There were 640 bluefin tuna tagged and released in 1993, 531 by recreational fishermen, 102 by commercial fishermen, and 7 by scientific staff. Nearly all bluefin tagged (567) were released off eastern U.S. coastal waters.

Thirty six tagged bluefin were recaptured in 1993, 25 by recreational fishermen, 10 by commercial fishermen, and 1 where the type of fisherman is

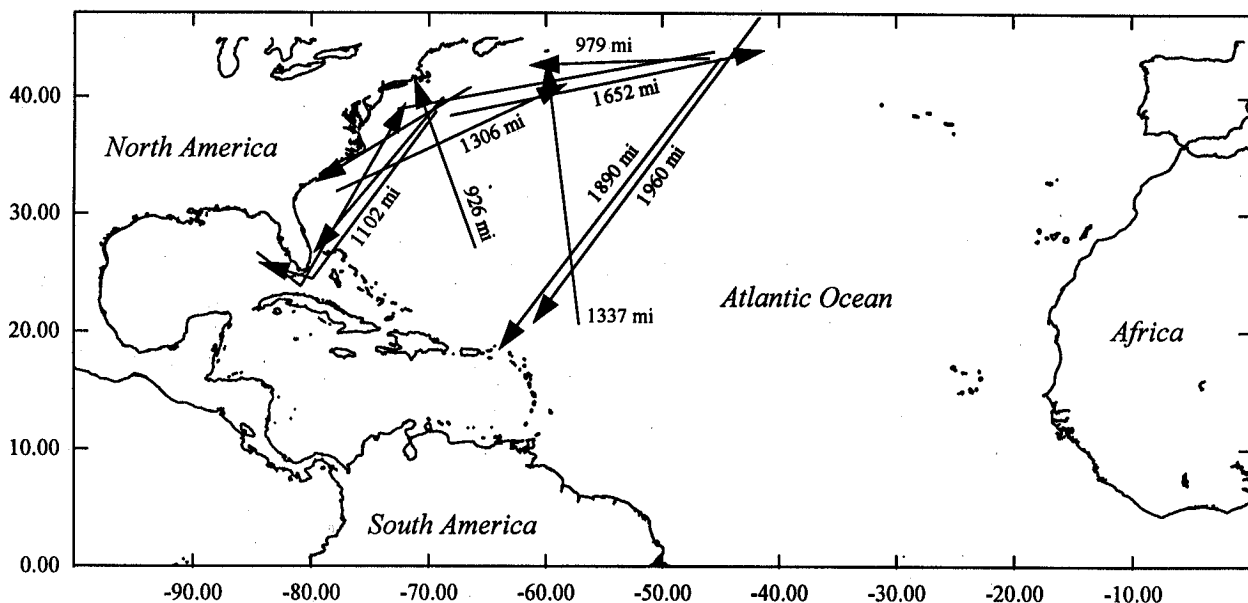


Figure 10. Movements of selected 1993 tag-recaptured swordfish.

unknown. Twenty-five of the 36 recaptures were in waters off eastern U.S. coastal waters, and 6 made trans-Atlantic crossings. The locations of 1993 bluefin recaptures are given in Table 5. A graph showing the years at-large is presented in Figure 11. Selected movements for 1993 bluefin tuna recaptures are shown in Figure 12.

The longest straight-line distance traveled by a bluefin tuna recaptured in 1993 was a trans-Atlantic crossing of about 4,573 nm; it was tagged and released in October, 1991, by a U.S. recreational fisherman 50 miles off the coast of New Jersey and recaptured in the Bay of Biscay (off the French coast, north of Spain) 625 days (1.7 years) later. Another bluefin tuna was tagged and released in September, 1990, by a U.S. recreational fisherman 70 miles south of Nantucket, MA. It was recaptured, after having made a trans-Atlantic crossing, by a commercial fisherman in August, 1993, in the Bay of Biscay (off the French coast, north of Spain).

The longest time at-large for a bluefin tuna recaptured in 1993 was 5,465 days (15.0 years). It was tagged and released in August 1978, by a purse

seine fisherman, 30 miles south of New Bedford, MA, and recaptured in August, 1993, by a recreational fisherman, east of Boston. This is the longest time at-large for any fish recaptured in 1993. Unfortunately, no hard parts were saved for Analysis, So potentially important information on age and growth were lost.

Table 5. Release and recapture areas for bluefin tuna recaptured in 1993.

Release Area	Recapture Area	Total
Eastern U.S. coastal waters	Eastern U.S. coast	25
	East. Atl.	5
	N.E. U.S.	3
	Canada	1
	W. Atlantic (offshore)	1
Unknown	East. Atl.	1
Total:		36

Yellowfin Tuna

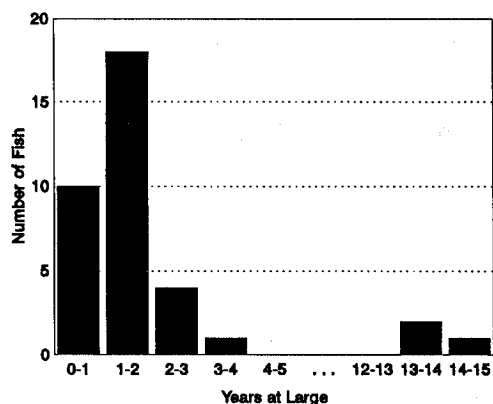


Figure 11. Years at-large for 1993 bluefin tuna recaptures (N=36).

In 1993, 855 yellowfin tuna were tagged and released, 571 by recreational fishermen, 241 by commercial fishermen, and 43 by scientific staff. Most (642) were released in eastern U.S. coastal waters, 72 off Bermuda, 26 in the western north Atlantic, and 26 in waters off north Florida, the Carolinas and the northeast U.S., and 23 off Texas. Tagged yellowfin tuna were also released off Louisiana, northern Bahamas, Hispaniola, Florida Panhandle, Trinidad and Tobago, and Cuba. There were 26 tag recaptured yellowfin tuna in 1993; 20 by recreational fishermen, and 6 by commercial fishermen. The locations of 1993 yellowfin tuna tag-recaptures are given in Table 6, and a graph showing the years at-large are presented in Figure 13.

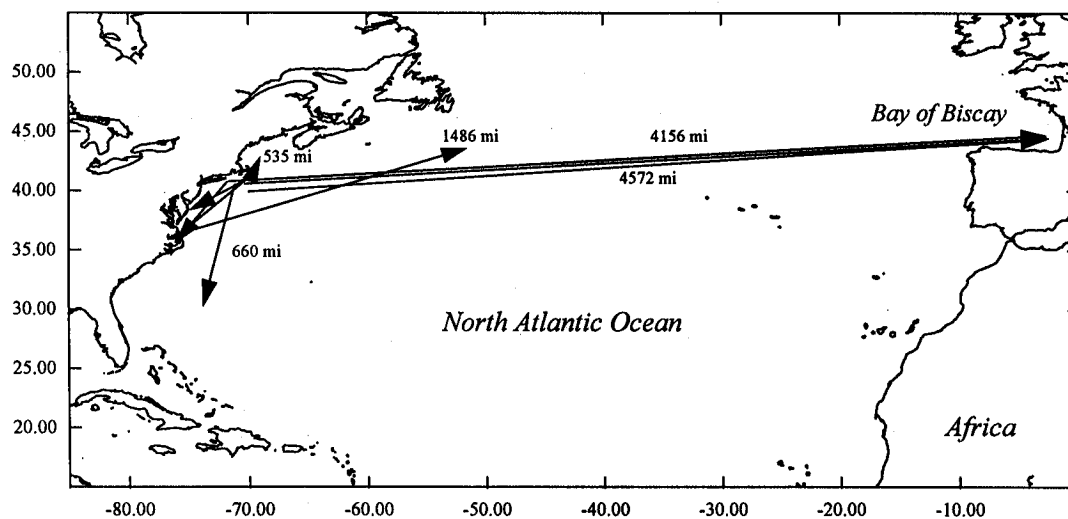


Figure 12. Movements of selected 1993 tag-recaptured bluefin tuna.

Table 6. Release and recapture areas for yellowfin tuna recaptured in 1993.

<u>Release Area</u>	<u>Recapture Area</u>	<u>Total</u>
Bermuda	Bermuda	11
Eastern U.S. coastal waters	Eastern U.S. coast	5
	Africa/Gulf Guinea.	2
	Africa/West	2
	N. Florida & Carolinas	1
Unknown	Eastern U.S. coast	1
	Bermuda	1
Louisiana	Louisiana	1
Texas	Mexican(Gulf)	1
N. Florida & Carolinas	Eastern U.S. coast	1
Total:		26

The longest time at—large for a 1993 yellowfin tuna recapture was 1,312 days (3.6 years). This fish was tagged and released 180 miles off the coast of Delaware in August, 1989, by a U.S. recreational fisherman, and recaptured south of Liberia (close to

the Mid-Atlantic Ridge), in April, 1993, by a purse seine fisherman.

The longest straight-line distance traveled by a 1993 tag-recaptured yellowfin tuna was 4,757 miles. It was released 120 miles off the coast of Delaware, in August, 1991, by a recreational fisherman and recaptured in the Gulf of Guinea (west of Sao Tome, Africa), in February, 1993, by a purse seine fisherman. Selected movements for 1993 release-recaptures are shown in Figure 14.

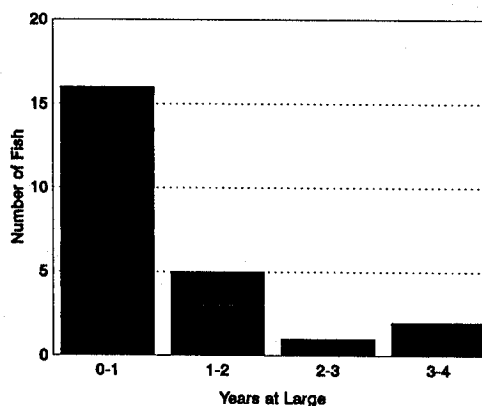


Figure 13. Years at-large for 1993 yellowfin tuna recaptures (N=24).

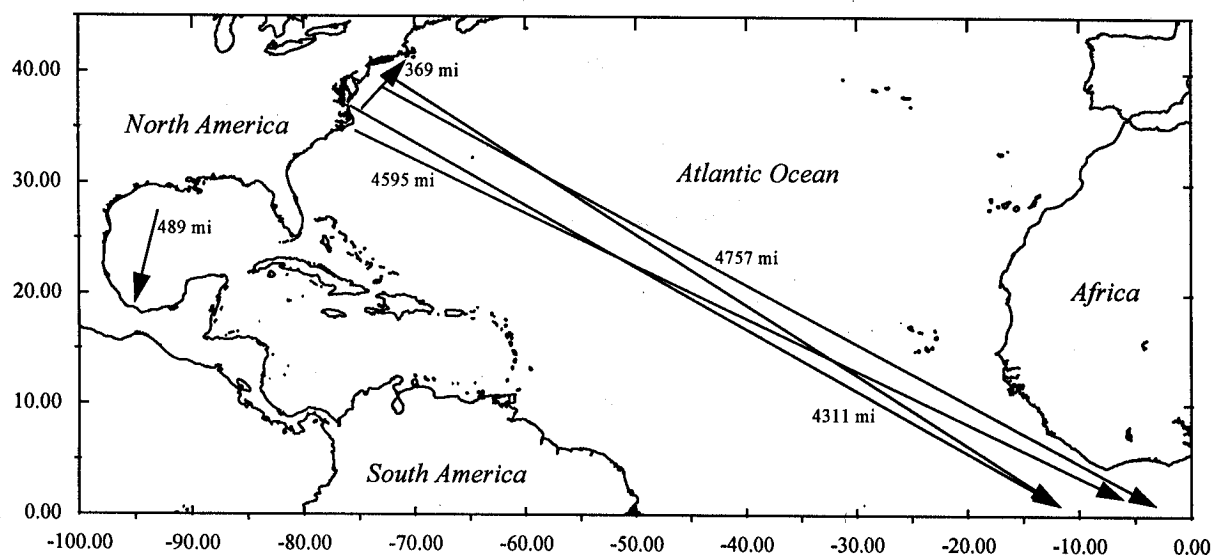


Figure 14. Movements of selected 1993 tag-recaptured yellowfin tuna.

Other Species

Many species are tagged by program cooperators in addition to the primary target species of billfish and tunas. Summaries of several of the most important non-target species for 1993 are given below.

Amberjack: There were 947 amberjack tagged and released in 1993, all by recreational fishermen. Most taggings (419) took place off the Florida Panhandle, and 276 in eastern U.S. coastal waters. Amberjack were also tagged and released off Louisiana, the Northern Bahamas, Texas, the Virgin Islands, and in the central Gulf of Mexico.

There were more amberjack tag-recaptures in 1993 than for any other species in our program — 165 tagged amberjack were reported recaptured. The longest time at-large for an amberjack recaptured in 1993 was 1,464 days; the longest straight-line distance traveled was 821 miles, from Cape Hatteras, NC, to Miami. A summary of the locations of the 1993 amberjack recaptures is given in Table 7. A graph showing the years at-large is presented in Figure 9.

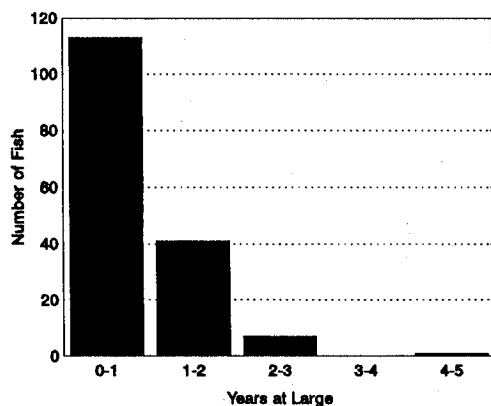


Figure 15. Years at-large for 1993 amberjack recaptures (N=162).

Table 7. Release and recapture areas for amberjack recaptured in 1993.

Release Area	Recapture Area	Total
Florida panhandle	Florida panhandle	76
	Louisiana	7
	N. Florida & Carolinas	1
Florida Keys	Florida Keys	23
	N. Florida & Carolinas	3
	W. Florida	1
	W. Atlantic (offshore)	1
	S.E. Florida	1
Eastern U.S. coastal wates	Eastern U.S. coast	11
	Fl. Keys	4
	S.E. Florida	3
	N. Florida & Carolinas	2
Louisiana	Louisiana	9
	Florida panhandle	3
S.E. Florida	S.E. Florida	4
	Florida Keys	2
	N. Florida & Carolinas	1
Texas	Texas	4
N. Florida & Carolinas	N. Florida & Carolinas	1
	N. Bahamas	1
East. Atl.	Florida Panhandle	2
W. Florida	Fl. Keys	1
Total:		161

Cobia: In 1993, 204 cobia were tagged and released: 67 off north Florida and the Carolinas, 53 off the Florida Panhandle, 32 off southeast Florida, 23 off Texas, and 17 off the coast of Louisiana. There were 25 recaptures of tagged cobia — their locations of release and recapture are summarized in Table 8. A graph showing the years at-large for 1993 recaptures is presented in Figure 17.

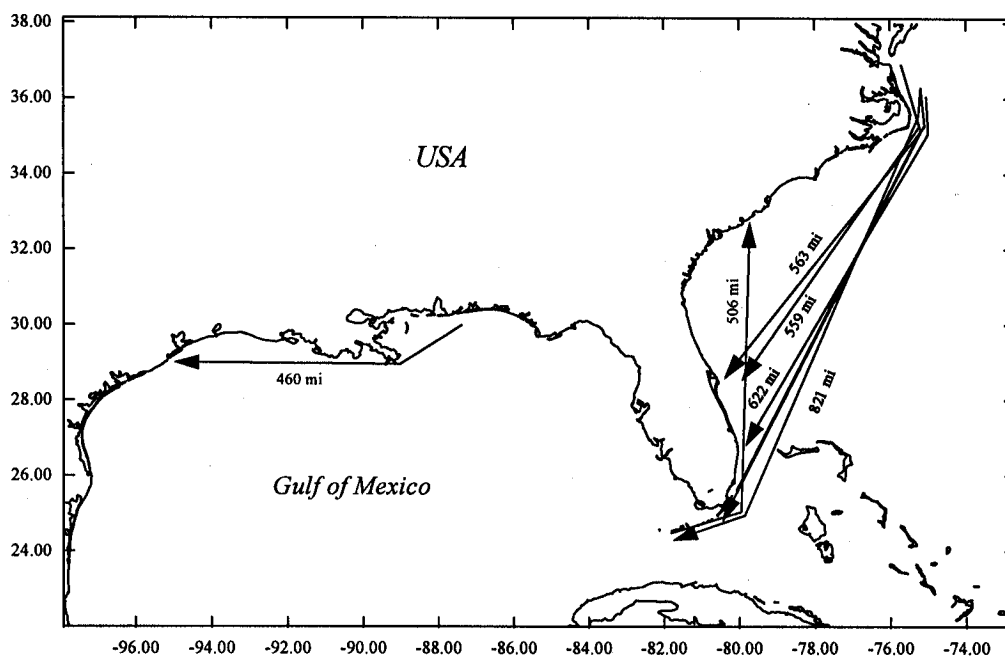


Figure 16. Movements of selected 1993 tag-recaptured amberjack.

Table 8. Release and recapture areas for cobia recaptured in 1993.

Release Area	Recapture Area	Total
N. Florida & Carolinas	N. Florida & Carolinas	6
	S. E. Florida	4
	Louisiana	1
Florida Panhandle	Florida Panhandle	3
	W. Florida	1
	Texas	1
	S. E. Florida	1
	Fl. Keys	1
Texas	Texas	1
	Louisiana	1
Fl. Keys	Florida panhandle	1
	Fl. Keys	1
Louisiana	Louisiana	1
Eastern U.S. coastal waters	N. Florida & Carolinas	1
S. E. Florida	S. E. Florida	1
Total:		25

The longest time at-large for a 1993 tag-recaptured cobia was 1,124 days (3.1 years). This fish was tagged off Titusville, FL, by a recreational fisherman, in November, 1990, and recaptured off the coast of Deerfield Beach, FL, by a spearfisherman, in December, 1993.

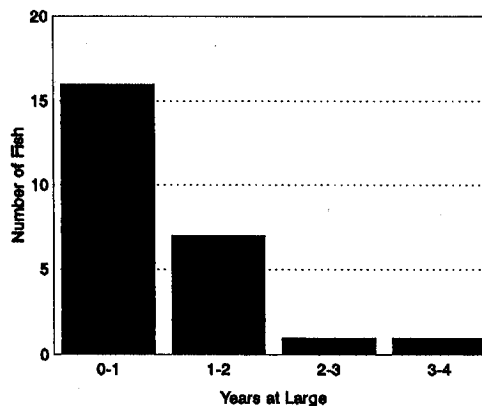


Figure 17. Years at-large for 1993 cobia recaptures (N=25).

The longest straight-line distance traveled by a 1993 tag-recaptured cobia was 565 miles. It was released

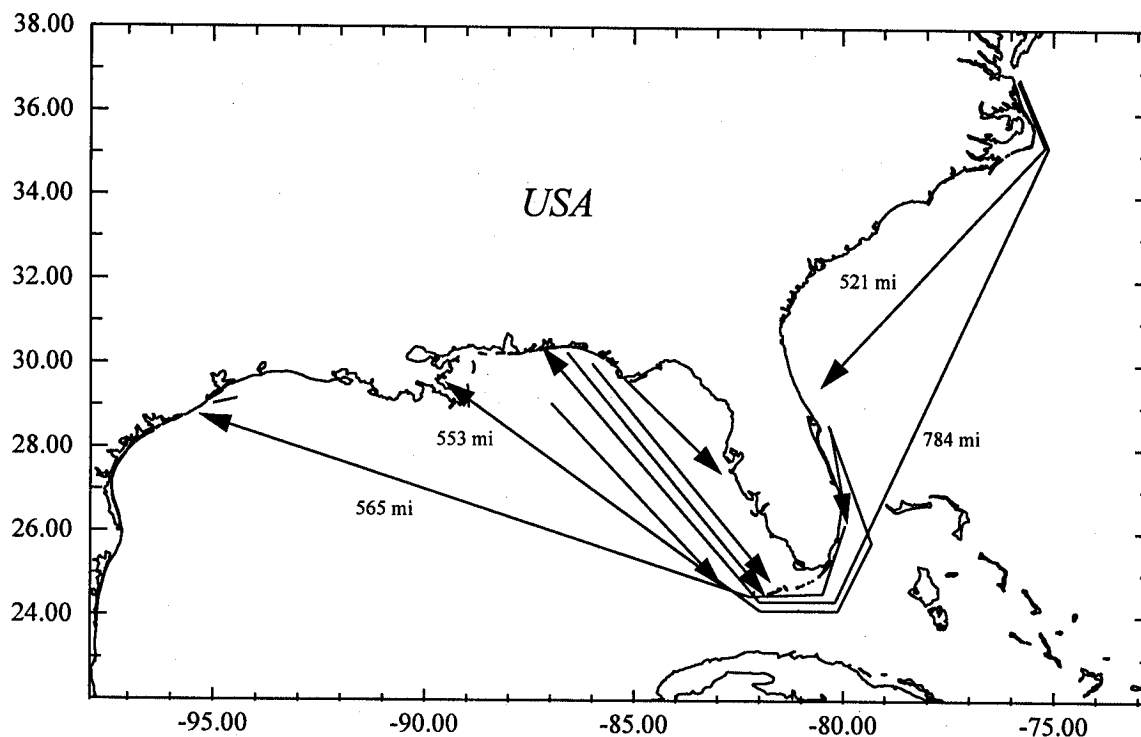


Figure 18. Movements of selected 1993 tag-recaptured cobia.

west of Virginia Beach, VA, in July 1991 and recaptured south of Pensacola Bay, Florida, in March, 1993. Selected movements for 1993 release-recaptures are shown in Figure 18.

King Mackerel: There were 2,578 king mackerel tagged and released in 1993; 2033 by scientific staff, 544 by recreational fishermen, and 1 by a commercial fisherman. Most were tagged off southeast Florida (2,033), Texas (345), north Florida and the Carolinas (126), and the Florida Panhandle (57). There were 127 recaptures in 1993 of tagged king mackerel; the areas of release and recapture for these fish are summarized in Table 9.

The longest time at-large (2,037 (5.6 years)) and the longest straight-line distance traveled (615 miles) for a tag recaptured king mackerel was reported in June, 1993. This fish was released off of Kitty Hawk, NC, and recaptured off the coast of Jupiter, FL. Figure 19 gives a summary of the times at-large for 1993 king mackerel recaptures, and Figure 20 shows selected movements.

Table 9. Release and recapture areas for king mackerel recaptured in 1993.

Release Area	Recapture Area	Total
S.E. Florida	S.E. Florida	62
	N. Florida & Carolinas	20
	N. Bahamas	1
	Fl. Keys	1
N. Florida & Carolinas	S. E. Florida	9
	N. Florida & Carolinas	6
	Fl. Keys	1
Fl. Keys	Fl. Keys	9
	S. E. Florida	4
	N. Florida & Carolinas	1
Texas	Texas	4
Florida Panhandle	Florida Panhandle	4
Eastern U.S. coast	Eastern U.S. coast	2
	S. E. Florida	1
Gulf of Mexico	Texas	1
Unknown	W. Florida	1
Total:		127

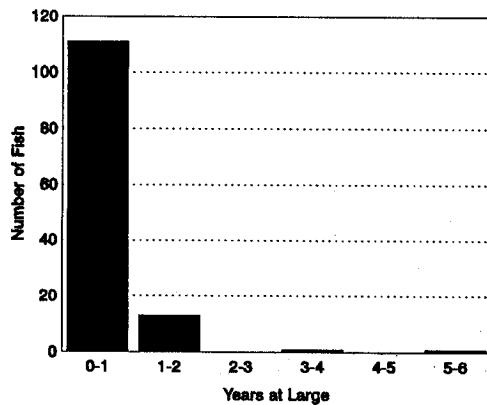


Figure 19. Years at-large for 1993 king mackerel recaptures (N=126).

Red Drum: There were 1,379 red drum tagged and released in 1993; most releases being in waters off north Florida and the Carolinas (735), the Florida Panhandle (202), the west Florida coast (145), Louisiana (137), and Texas (86). Ninety-nine red drum were recaptured in 1993, nearly all in the same areas they were released. The longest straight-line distance traveled was 173 miles, from Venice, LA, to south of Atchafalaya Bay, LA. The longest time at-large for a 1993 recaptured red drum was 1,201 days (3.3 years), for a fish that was released in Atchafalaya Bay and recaptured in Terrebonne Bay, LA. A graph of red drum years at-large is presented in Figure 21. Selected movements of 1993 red drum are not illustrated.

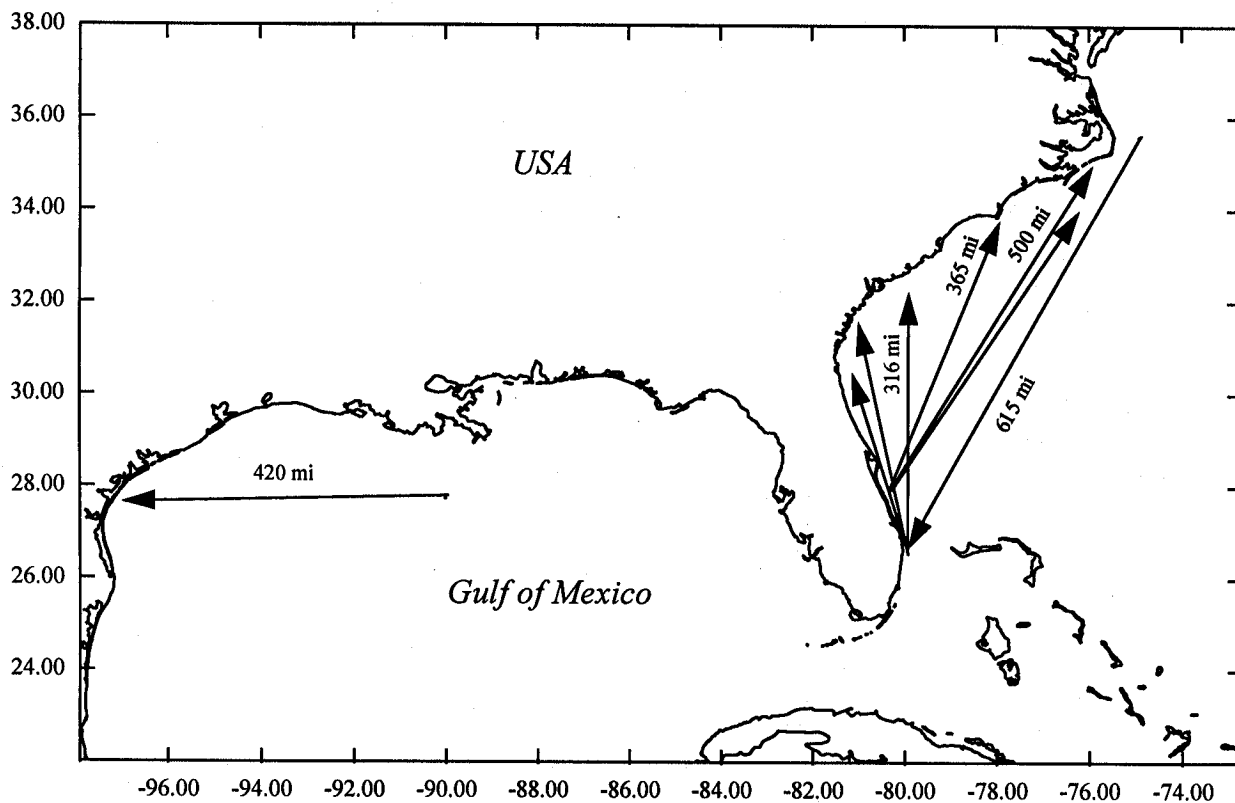


Figure 20. Movements of selected 1993 tag-recaptured King Mackerel.

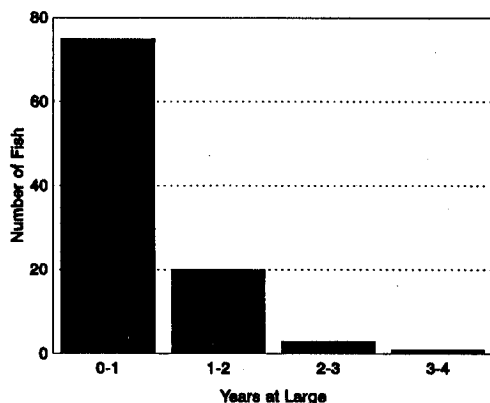


Figure 21. Years at-large for 1993 red drum recaptures (N=99).

Tarpon: The distribution and sale of tags for tarpon is being managed by the Florida League of Anglers. They provide tags to those people who request them by purchasing the tags with donations made to them by clubs and individuals. If you would like to assist them by tagging tarpon or by sending a donation, please contact:

Florida League of Anglers
 c/o Norma Stoppelbein
 P.O. Box 1109
 Sanibel, Florida 33957
 (813) 472-2685

There were 1,057 tarpon tagged and released in 1993, most off west Florida (623), Louisiana (259), southeast Florida (101), and in north Florida and the Carolinas (42). There were 11 tarpon recaptured in 1993. The longest straight-line distance traveled by a tag-recaptured tarpon in 1993 was 429 miles, from North Pass, LA, to Boca Grande, FL. The longest time at-large for 1993 tag-recaptured tarpon was about 862 days, (2.4 years) for a fish that was released off Ft. Lauderdale FL, in October, 1990 and recaptured February, 1993, off of Carysfort Reef in the Florida Keys. Figure 22 gives a summary of the times at-large for 1993 tarpon recaptures.

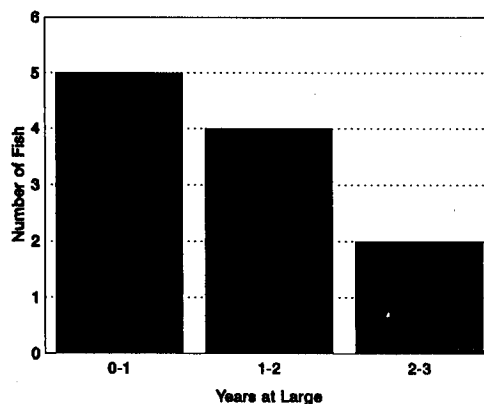


Figure 22. Years at-large for 1993 tarpon recaptures (N=11).

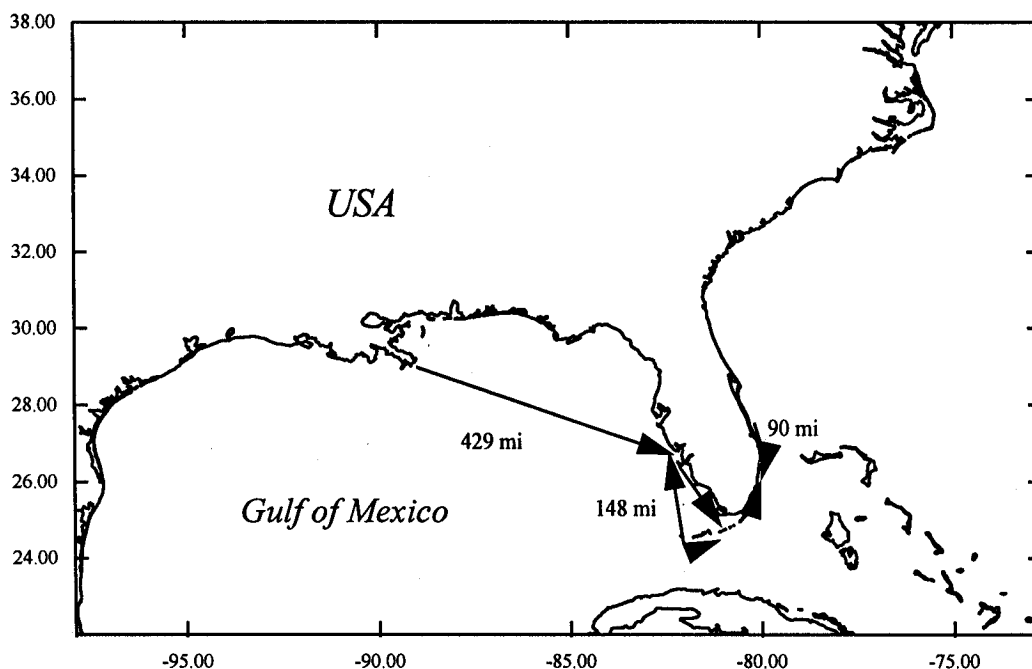


Figure 23. Movements of selected 1993 tag-recaptured Tarpon.

Commercial Participation

Commercial fishermen contribute significantly to our tagging program. This is particularly true for swordfish and bigeye tuna but also includes other species as well. The largest group of commercial fishermen involved in our program is the **Blue Water Fishermen's Association [BWFA]**, although non-BWFA commercial fishermen also contribute (Table 10). For example, all commercial participants tagged and released 1,219 swordfish in 1993, whereas Blue Water Fishermen's Association accounted for 932 (72%) of all swordfish tagged and released in our program for 1993. In addition, BWFA participants tagged and released 134 (65%) of the bigeye tuna, 103 (12%) of the yellowfin tuna, and 138 (10%) of the white marlin in 1993. The BWFA members, as well as all other commercial fishermen, are critical participants of the Cooperative Tagging Center.

Table 10. *Blue Waters Fishermen's Association members tagging 50 or more fish for CTC in 1993.*

<u>Captain</u>	<u>Number Fish Tagged</u>
T. Baker Dunn	481
Eric Burcaw	269
Larry Horne	235
James Mears	158
Robert Burcaw	147
Alex Sutton	141
Dan Mears	137
Richard Mears	124
Christian Einselen	109
Tom Barrie	98
A.J. Surrey	57

Federation of Japan Tuna Fisheries

During the 1994 meeting of the International Commission for Conservation of Atlantic Tunas (ICCAT), the Federation of Japan Tuna Fisheries (FJTF) agreed, in theory, to start volunteer tagging of billfish (that come alongside their boats alive) from their high seas longline operations. Although this activity will not start until the 1995 fishing season, this research marks a potentially significant improvement in Atlantic-wide tagging of billfish.

The FJTF will utilize the newly developed HM tag discussed in the next section. The legend on these tags will have an ICCAT name but a NMFS address to facilitate computerization of these data at the Southeast Fisheries Science Center in Miami. To help assist in recapture reporting from the Japanese vessels, the tag legend will also have the Japanese symbols for the word "reward".

Improving Tagging Information

The ultimate source of information for the CTC has always been the recapture of tagged fish. However, for over 40 years this program has been known as a "Tag and Release" program and emphasis on obtaining tag recapture information has, to a certain extent, been neglected. This problem is more than just semantics because neglect of the recapture aspects of the program results in many lost opportunities for vital scientific information. We have developed several approaches to improve the lack of effort on recapturing tagged fish, including issuing fluorescent orange tag recapture cards to improve the quality and quantity of recapture information (Figure 23). Time and experience have taught us that it is unreasonable to assume that the public can remember all the information we want from a tag-recaptured fish. The card is printed on fluorescent orange paper so that no matter how much time passes before a tagged fish is recaptured, this card will be easy to among your boat papers. The **Tag Recapture Card** is available in English and Spanish.

Our *Save It for Science* program is also another way we are trying to emphasize the recapture aspects of tagging activities. This program, started in 1982, encourages fishermen to retain carcasses of tag-recaptured fish, thereby affording scientists the opportunity to gain further knowledge on age and growth, along with examining the condition of the tag in the fish. The condition of the tag in the fish is closely monitored through the performance research and provides important information that is used to develop better tags.

The CTC encourages anglers to save all legal size tag recaptured fish by freezing, if possible, and contact the tagging program at 1-800-437-3936 for further instructions. On weekends or after business hours, call Dr. Eric Prince at (305) 598-0944.

TAG RECAPTURE CARD

1. SPECIES: _____

2. TAG NUMBER: _____

3. DATE RECAPTURED: _____

4. LOCATION/COUNTRY RECAPTURED: _____

5. LENGTH (inches/centimeters): _____ (lower jaw fork length)

6. WEIGHT (pounds/kilograms): _____ SEX: Male ☐ Female ☐

7. FISHING GEAR: _____

8. NAMES OF BOAT AND CAPTAIN/ANGLER: _____

9. ADDRESS OF (S) ABOVE: _____

10. PHONE OF (S) ABOVE: _____

11. HAS FISH BEEN SAVED (FREEZING) SO IT CAN BE SAMPLED?
 YES ☐ NO ☐

THERE IS AN EXTRA REWARD FOR A FROZEN FISH. CALL COLLECT
 (305) 361-4248 (Daytime)
 (305) 598-0944 (Night/Weekends)

12. COMMENTS: _____

Figure 24. Tag recapture cards are printed on fluorescent orange paper and are available in English as well as Spanish.

The quality of growth information derived from tagging studies is directly related to the accuracy of the length and weight measurements and the length of time the fish has been at large. If the estimate of length at release is too high, then there is the potential that the reported length at recapture will show "negative growth." Thus, these data may not be useful in a growth study. Lengths and weights should be estimated or measured as precisely as possible. Some anglers use marks on either side of their boat or measuring tapes to help estimate size when the fish is brought to the boat before releasing.

Conscientious taggers are hard to find. For example, there are times when release cards are often missing from our files for recaptured fish reported to our program. In other words, some participants do not take the time to return the release cards, properly filled out. This disturbing trend seems, in part, to be related to the hectic environment associated with tournament tagging activities but is prevalent in ALL segments of the tagging community. If you are going to participate, PLEASE take your time and use the correct tagging procedures. This is particularly relevant to returning the tag release cards to us, properly filled out, as soon as possible. We prefer to receive release cards within a week after release since many tagged fish are often recaptured during the first month at large.

When you fill out your Fish Tagging Report card, please keep the following items in mind:

- Fill in the exact date.
- Give the location in degrees and minutes of latitude and longitude, if possible. If this is not possible, tell us how far you were offshore, or the distance from some landmark.
- The length and weight boxes on the tagging card specify estimated size. If you measure the fish instead, please either cross out the *(est)* on the card or write in "measured." Also let us know if the length was *Total* (from the tip of the nose or bill to the end of the tail) or *Lower Jaw to Fork Length [LJFL]* (from the end of the lower jaw to the fork of the tail).
- Record the date, location, and size data immediately after releasing the fish — NOT AT THE END OF THE DAY —

to avoid errors on the release card.

- Clearly **PRINT** the names and addresses of anglers and captains to insure proper credit can be given to them.

Acknowledgment Cards

- We send acknowledgment cards to tagging participants to confirm that we received the release card(s). If you do not receive an acknowledgment card, please inform us as soon as possible.
- It is also a good idea to keep a log of tagging information so that you can provide us with accurate information in case the data are lost. Tag-release cards are occasionally lost in the mail, but if we can find out about the loss before too much time passes, there is a chance that we can work together to recover the data.
- We usually send acknowledgment cards to the captain only, so if you would like one sent to the angler, please note this on the release card.

The target area identified for placing tags in billfish and tunas has, for many years, included an area near the head that we now feel is too close under most tagging conditions (Figure 23). When seas are flat calm and the fish has struggled to the point where they hardly move when brought alongside the boat, tagging within six inches of the head, gill plates, and eyes probably doesn't risk serious injury. However, most tagging **does not** take place under these conditions and we recommend a more prudent approach by placing the tags no closer than 12 inches from the head, gill plates, eyes, and other vital organs to avoid a last-minute movement by the fish causing injury. The tag should ideally be placed in the dorsal musculature, well above the lateral line, to minimize the chance for serious injury, excessive hemorrhaging, and to promote rapid healing of the tag wound. This can be accomplished by taking a downward or dorsal tag placement approach over the fishes back (Figure 24 a and b) so the tag is placed as

close as possible to the dorsal spines. Again, tags should be placed in the dorsal musculature starting no closer to the head than about 1/2 the length of the pectoral fin. We also recognize that dorsal tag placement over the back of the fish (Figure 24 a) can't always be accomplished because many fish turn sideways when brought along side the boat. Many fish (particularly tuna and billfish) come along side the boat sideways with their belly closest to the boat and the target area are furthest from boatside. Tagging a fish that comes to the boat in this fashion necessitates a lateral approach for tag placement (see Figure 24 b). Taking a lateral approach for tag placement with an applicator pin parallel to the tagging pole is difficult and often results in misplaced tags. This problem can be circumvented by using a tagging pole with perpendicular, as well as parallel applicator pins (see Figure 24). The wooden pole shown in Figure 24 that can accommodate dual applicator pins is made of 1.25 inch diameter wooden dowel (pine). When a fish comes along side the boat on its side, tagging can best be accomplished by using the

What To Do If You Recapture a Tagged Fish

Persons catching a tagged fish should understand that, to maximize the value of the information we obtain from tag-recaptures, the whole fish needs to be saved for scientific examination. If the fish is a billfish or tuna, we recommend that you **save the whole fish** (by freezing, if possible) and contact the CTC immediately at:

 (800) 437-3936

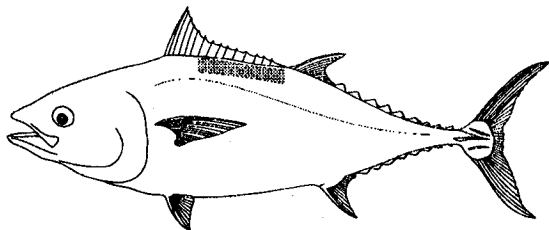
for further instructions. On weekends or at night, call Dr. Eric Prince at:

 (305) 598-0944.

perpendicular applicator as shown in Figure 24. In essence, the tag placement using the perpendicular applicator mimics a dorsal approach using the parallel applicator over the fish's back. By equipping the tagging pole with dual applicator pins (parallel and perpendicular), the tagger has the flexibility to make last minute adjustments in the way the tag is placed in the fish, depending on the position of the fish at boatside. The idea of dual applicator pins is new and the Cooperative Tagging Center is not yet issuing 1.5 inch diameter tagging poles to participants but these can easily be obtained at your local hardware store.

The dorsal tag placement approach avoids the dense concentration of highly vascularized red muscle tissue which is concentrated in the area underneath and adjacent to the lateral line. This area should be avoided to minimize hemorrhaging and promote healing of the tag wound. In most species, there is little, if any, red muscle tissue along the back next to the dorsal spines. If the lateral approach must be taken, the closer the tag can be placed to the dorsal spines, the better the chances for avoiding or minimizing hemorrhaging during the tagging event. **Remember, tagging doesn't kill fish, but BAD TAGGING CAN KILL FISH.**

(a)



(b)

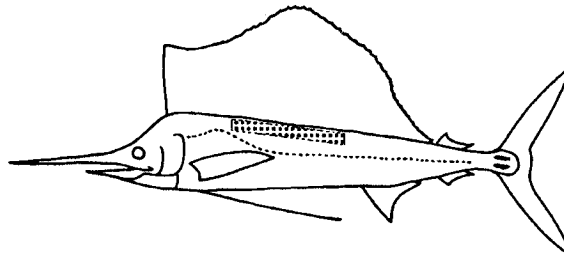


Figure 23. Target area (shaded region) for placing tags in a) tunas and b) billfish. The preferred target site for tunas or billfish should be placed well above the lateral line to avoid serious injury. The tag should be positioned no more forward than at least one-half back of the pectoral fin. Billfish and tuna are elongated species and moving the target area further back toward the tail will help prevent misplaced tags hitting vital organs, ultimately increasing the number of tag-recaptured fish.

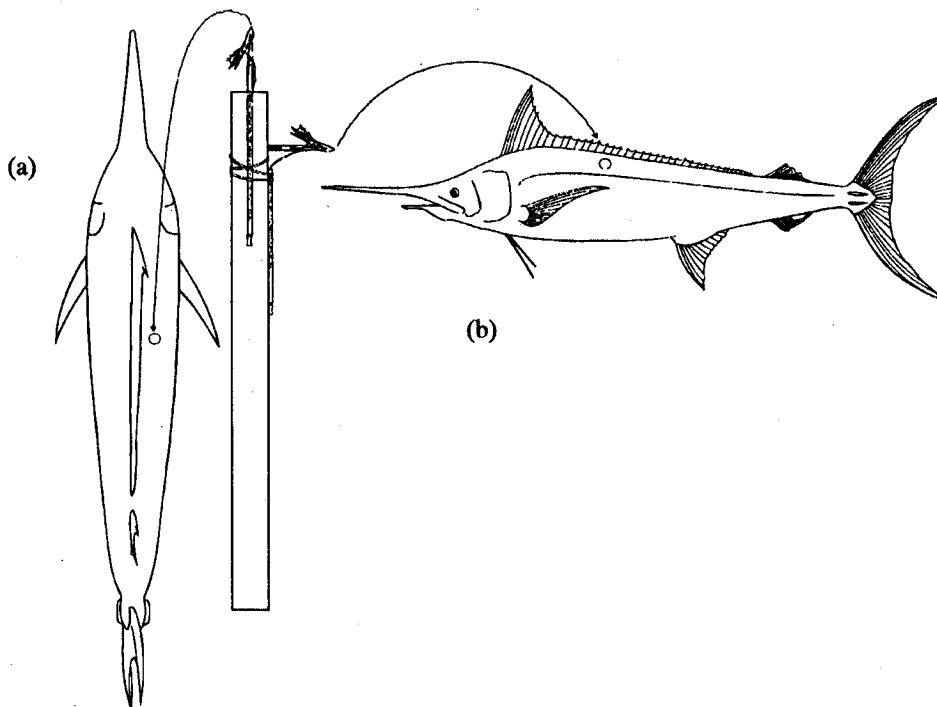


Figure 24. The preferred placement of the tag is the dorsal or downward approach (A). The lateral approach (B) is the second option.

Cooperative Tagging System

As part of the commitment to improve the usefulness and application of tagging data, NMFS's Southeast Fisheries Science Center has designed a comprehensive set of computer software for managing tagging data. This computer software is called the Cooperative Tagging System (CTS). The system was developed to act as a centralized depository for marine tagging data in the Atlantic Ocean and was intended to be used by all federal, state, and private agencies that tag marine animals in the Atlantic Ocean and adjacent seas. Over 25 private, state, federal, and international tagging programs have received copies of CTS, and several are using it for the storage and management of their tagging data. Agencies now using the CTS, or who have indicated that they will participate in this program, include: the International Commission for Conservation of Atlantic Tunas (ICCAT); the Fishery Resource Assessment and Management Program of the Caribbean Community (CARICOM); Canada's Department of Fisheries and Oceans; the American Littoral Society; The Billfish Foundation; and most coastal state agencies along the U.S. east and Gulf coasts.

Tag Development and Performance

The NMFS Miami Laboratory Cooperative Tagging Center has recently introduced a new tag design in 1994. This new tag design, referred to as the HM tag, is similar to The Billfish Foundation (TBF-type) tag. The HM tag (HM stands for highly migratory) is constructed of medical grade nylon and uses a stainless steel applicator for tag placement which is withdrawn, leaving only the nylon anchor inside the fish. The HM tag is designed as an intermuscular tag and will slowly be introduced as a replacement for the "R-type" tags. Improvements incorporated into the RF tag are based on the observations of recaptured specimens initially tagged with R-type and TBF type tags. By using medical-grade nylon for the anchor tip we hope to reduce the rejection of the tag by the fish, thereby potentially increasing its biological compatibility. While there have been few preliminary studies to confirm this with fish muscle,

it has gained widespread acceptance in the biomedical arena for use in human surgical implants. In addition, the tag streamer includes an English legend and Japanese characters for the word "reward" in an effort to increase the return of recapture data to the CTC.

Cooperative Efforts

Double-Tagging

The tagging procedures for the double tagging study are more demanding than the procedures used in the conventional tagging program. Therefore, double tagging using the NMFS R tag, the Billfish Foundation BF tag, or the NMFS HM tag is not for everyone and we prefer that only the more experienced taggers attempt this activity. For example, when double tagging we prefer to have one tag placed on each side of the billfish. This would greatly increase the probability that a tag on a recaptured fish would be seen when brought alongside the boat. However, tagging on both sides of the fish takes longer and is not always possible under field conditions. Some of the more innovative participants in the experiment built tagging sticks that insert both tags into the fish at the same time. Although this simplifies the tagging procedure and saves time, we discourage this practice because having both tags on one side of the fish close enough to touch each other invalidates the purpose of the experiment. That is, under these conditions the shedding rates of the two tags are not independent of each other.

To date, there has been a total of 2,361 double-tagged billfish released and 25 (about 1%) of these have been recaptured (Table 12). Most of the double tagging has been with sailfish, but significant numbers of marlin and swordfish have also been double-tagged. Both the commercial participants (mostly BWFA members) and recreational anglers have participated actively in the double tagging program. Of the 25 recaptured fish, 16 had both tags intact, while 9 had only the TBF tag. The NMFS R tag was apparently shed in 9 fish. Because the total number of double tagged billfish that have been recaptured has been so low, definitive conclusions from these preliminary results are not possible. We greatly appreciate the efforts of recreational anglers

and BWFA members for their contributions to the double tagging program, as more effort is required to double tag properly.

AFTCO Manufacturing Co.
17351 Murphy Avenue
Irvine, CA 92714.
(714) 660-8757

Table 12. Summary of double-tagging experiments conducted jointly by The Billfish Foundation and NMFS.

SPECIES	RELEASES	RECAPTURES
Sailfish	834	15
Blue Marlin	606	3
White Marlin	364	5
Swordfish	526	2
Black Marlin	12	0
Striped Marlin	10	0
Spearfish	9	0
TOTAL	2,361	25

Tagging Awards

The Axelson Fishing Tackle Company (AFTCO) first started a cooperative effort with the CTC to recognize contributors to the tagging program in 1989. Several other tagging programs also participate, including The Billfish Foundation, Fish Trackers, Inc., Gulf Coast Conservation Association, and the South Carolina Marine Game Fish Tagging Program. Anglers and captains compete for handsome trophies for those tagging the most of each of the seven designated species. All fish must have been tagged in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. Anglers and captains who tagged a certain number of each species received an AFTCO Tag Flag award. The designated species, and the number required to qualify (in parentheses) for the AFTCO Tag Flag awards for each species, are: albacore (5), bigeye and/or yellowfin tuna (5), bluefin tuna (5), blue marlin (3), white marlin (5), and sailfish (10). [Note: Cobia and amberjack were dropped from Tag/Flag tournaments in 1991.] For further information about the AFTCO Tag/Flag Tournament, contact the CTC or:

The winners of the 1993 designated categories are listed in Table 13. Some of the winners are shown in Figure 25, which was taken at the annual International Game Fish Association banquet where the awards were presented. Not all winners listed attended the banquet. AFTCO also awards trophies to the angler and captain who tagged the most billfish overall. The overall winners for 1993 were Jack Miller and John Bayliss.

The winner of our king mackerel tag-return lottery for 1993 was Norman Mansfield of Jacksonville, FL. The winning tag was released Feb. 17, 1993, off Palm Beach, FL and recaptured June 10, 1993, off Jacksonville FL.

Each year, the International Commission for the Conservation of Atlantic Tunas (ICCAT), headquartered in Madrid, Spain, issues lottery rewards (\$500 each) for tag recaptured temperate tuna (i.e. bluefin tuna), tropical tuna (i.e. yellowfin tuna, blackfin tuna), and for billfish (i.e. swordfish, marlin, sailfish). These rewards are given as an incentive for fishermen to participate in the Atlantic wide tagging programs by many countries for highly migratory species. The three ICCAT lottery winners for 1993 were: (1) Temperate tuna, Mr. Melchor Amunarriz of Fuenterrabia, Spain, who caught a tagged bluefin tuna off Brazil in July, 1993, originally tagged and released off the U.S. in October 1991, by a recreational angler; (2) Tropical tuna, Mr. Ed Slick of Hagerstown, Maryland, who caught a tag recaptured blackfin tuna off the Florida keys that was tagged and released about a month earlier in the same area; and (3) Billfish, Mr. Bill Noll of Hollywood, FL, who recaptured a tagged sailfish off Miami, FL that was tagged and released about two years earlier in the Florida Keys.

We began to acknowledge participants of the CTC in 1976. We cannot give taggers credit for fish tagged and released unless we receive the tag-release cards. Please make sure the addresses on the cards are correct and complete. Some participants use stamp pads or labels on their release cards. Program participants for 1993 are listed in Appendices 1 and 2.

The CTC extends its congratulations to the winning anglers and captains, and to the sponsoring organizations for their effort and cooperation in the conservation of our marine game fish resources.

Recapture Incentives and Rewards

In the past, the CTC has offered a \$5.00 reward to the angler reporting a tagged fish. The CTC now awards a gray embroidered hat, with the NMFS tagging flag emblem, to the person reporting the recapture of a tagged fish (monetary awards are

available for king mackerel recaptures by special request only). The gray hats cannot be purchased; however, the same hat in either black or in various colors can be purchased for \$10.00 (\$2.00 of this charge goes towards a NMFS fund to buy the gray hats) by writing or calling our supplier:

Island Custom Embroidery
88511 Overseas Highway
Tavernier, FL 33070
(305) 852-6317
FAX (305) 852-9553

Table 13. Winners of the 1993 individual trophies (both anglers and captains tagging the most fish of the designated species) for the AFTCO Tag/Flag tournaments.		
Species	Winners	
	Anglers	Captain
Albacore	Paul Visentin	George Kazdin
Donated by:	New York Sportfishing Federation	American Sportfishing Association
Bluefin Tuna	Everett Petroni Jr	Al Anderson
Donated by:	International Game Fish Association (IGFA)	International Game Fish Association (IGFA)
Bigeye and Yellowfin Tuna	Stanley Klimek	Jerry Shepard
Donated by:	American Sportfishing Association	American Sportfishing Association
Blue Marlin	John Mueller	William McCauley
Donated by:	National Coalition for Marine Conservation (NCMC)	National Coalition for Marine Conservation (NCMC)
White Marlin	Jack Miller	John Bayliss
Donated by:	The Billfish Foundation (TBF)	The Billfish Foundation (TBF)
Sailfish	Thorne Donelly Jr.	John Bayliss
Donated by:	International Game Fish Association (IGFA)	The Billfish Foundation



Figure 25. Winners of AFTCO 1993 tagging awards, with the AFTCO representative. Front row: John Miller, Bill McCauley, Paul Visentin. Back row: Ben Secrest (AFTCO), John Spence (TBF), Jack Miller, Al Anderson, Everett Petroni, Thorne Donelly, Eric Prince (NMFS).

Appendix 1. Captains who made outstanding contributions to the CTC in 1993 by assisting in the tagging of 11 or more sailfish, blue marlin, white marlin, swordfish, bluefin tuna, yellowfin tuna, albacore tuna and bigeye tuna. The "Captain Tagged" column signifies fish tagged by anglers while fishing as captains--these fish are included in the total.

CAPTAIN	SPECIES								Total Tagged	Angler Tagged
	Sail-fish	Blue Marlin	White Marlin	Sword-fish	Bluefin Tuna	Yellow-fin	Alba-core	Bigeye Tuna		
T BAKER DUNN	51	21	12	382	0	4	0	11	481	0
JOHN BAYLISS	238	5	90	0	0	86	0	0	419	1
AL H ANDERSON	0	0	3	0	176	102	0	0	281	0
JERRY SHEPHERD	14	15	14	0	0	237	0	0	280	0
ERIC BURCAW	1	3	30	183	9	37	2	4	269	0
LARRY HORNE	0	22	14	167	5	8	0	19	235	0
JOHN FABRYKA	2	4	22	107	0	44	0	1	180	29
JAMES D MEARS	0	6	16	64	11	27	4	30	158	4
ROBERT BURCAW	0	1	35	96	1	11	0	3	147	1
ALEX SUTTON	2	14	5	49	10	12	1	48	141	0
DAN MEARS	0	7	3	64	14	42	0	7	137	1
BOB CROSWAIT	7	6	25	0	1	94	0	0	133	0
RICHARD MEARS	5	13	19	48	19	20	0	0	124	0
BRAD SIMONDS	76	44	2	0	0	0	0	0	122	20
ANDREW DANVELO	0	0	0	0	96	25	0	0	121	9
LUIS MILLAN	26	10	81	0	0	0	0	0	117	0
CHRISTIAN EINSELEN	1	2	14	43	2	39	0	8	109	5
MIKE BRUCKER	94	5	8	0	0	0	0	0	107	1
EVERETT A PETRONIO	0	0	3	0	57	44	0	0	104	16
TOM BARRIE	0	12	0	62	3	0	3	18	98	0
DAVID MARKS	14	21	11	26	0	7	0	5	84	8
WILLIAM MCCAULEY	5	65	12	0	0	0	0	0	82	0
BUTCH M STANDEVEN	74	3	2	0	0	0	0	0	79	0
JOE BRODESSER	75	0	4	0	0	0	0	0	79	61
BILL MCCAULEY	10	58	9	0	0	0	0	0	77	0
DANIEL SHAWHAN	0	2	0	58	0	0	4	10	74	0
MARK E HILL	73	0	0	0	0	0	0	0	73	1
CHRIS WALKER	6	8	28	29	0	0	0	0	71	0
TIM MCDONOUGH	3	6	21	22	0	9	0	10	71	0
BAKER DUNN	1	1	3	49	0	1	0	15	70	7
PETE BARRETT	0	0	2	0	3	23	39	0	67	0
BILL BORER	12	53	1	0	0	1	0	0	67	2
ROM WHITAKER	17	21	14	1	7	4	0	0	64	0
RANDY JENDERSEE	16	47	0	0	0	0	0	0	63	0
BILL NOLL	60	0	0	0	0	0	0	0	60	0
JIM GARRITY	52	5	2	0	0	0	0	0	59	0
GARY CARPENTER	0	0	0	0	8	38	12	0	58	0
A J SURREY	0	0	7	29	9	6	3	3	57	0
ED DWYER	31	19	2	0	0	1	0	3	56	0
PETER DUBOSE	6	6	42	0	0	2	0	0	56	0
SKIP FELLER	6	13	18	0	0	15	0	0	52	0
RALPH VICK	49	0	3	0	0	0	0	0	52	0
MICHAEL JOHNSON	0	0	0	29	5	17	0	0	51	1
MIKE NEISLER	0	0	0	0	0	50	0	0	50	0
BOB REECE	26	2	22	0	0	0	0	0	50	0
BENJI STANSKY	4	3	23	0	2	18	0	0	50	0
JEFF WEST	16	12	22	0	0	0	0	0	50	1
SKIP NIELSEN	48	0	1	0	0	0	0	0	49	0
JERRY GRANDINETTI	0	0	0	42	0	1	1	4	48	1
TOMMY TILOTTA	39	2	7	0	0	0	0	0	48	0
DEAN ADLER	36	11	1	0	0	0	0	0	48	0
JIM BOWMAN	25	13	4	0	4	0	0	0	46	0
TAYLOR TYLER	6	3	36	0	0	0	0	0	45	5
ROBERT REECE	39	0	6	0	0	0	0	0	45	0
PALMER CLINGMAN	1	11	4	16	0	0	0	12	44	12
ALEX ADLER	42	0	0	0	0	0	0	0	42	3
KEITH LARSON	0	2	3	12	2	12	0	11	42	0
GARY W BACON	10	0	4	0	0	28	0	0	42	0
MIKE LEPREE	33	2	6	0	0	0	0	0	41	0
ROBERT CASSIDY	0	0	0	0	0	18	23	0	41	12
JOHN KORNAHRENS	0	0	0	14	1	18	0	7	40	0
AL JOHNSTON	1	0	1	35	0	0	0	2	39	0
ARMAND DIDIER	0	27	11	0	0	0	0	0	38	0
NORM WELTER	38	0	0	0	0	0	0	0	38	5
FRED RUSHIN	18	4	7	0	0	8	0	0	37	0
DON SPEICHER	25	0	12	0	0	0	0	0	37	0

Appendix 1. (Continued)

CAPTAIN	SPECIES								Total Tagged	Angler Tagged
	Sail-fish	Blue Marlin	White Marlin	Sword-fish	Bluefin Tuna	Yellow-fin	Albacore	Bigeye Tuna		
HECTOR R LOPEZ FLORES	3	26	8	0	0	0	0	0	37	0
JIMMY DAVID	35	1	0	0	0	0	0	0	36	8
BILLY BLACK	4	28	4	0	0	0	0	0	36	0
T RICH TEMPLETON	0	0	0	0	22	13	0	0	35	8
JACK FALCUCCI	16	0	13	0	0	6	0	0	35	0
CAPT O B OBRYAN	11	23	1	0	0	0	0	0	35	0
CHRIS WALKER	4	4	4	22	0	0	0	0	34	0
TOM DAVIS	0	2	7	12	1	2	0	10	34	9
MATT MUZSLAY	0	0	1	0	18	8	7	0	34	0
MARK GOTTWALD	0	0	0	0	0	28	6	0	34	4
JIM SHARPE	31	3	0	0	0	0	0	0	34	0
DAVID WRIGHT	1	3	21	0	7	2	0	0	34	1
GLENN M CAMERON	32	0	0	0	0	0	0	0	32	0
DAVID R DOLL	32	0	0	0	0	0	0	0	32	0
GLENN P TEMPLET	25	7	0	0	0	0	0	0	32	0
JAMES E LAMBERT	31	0	0	0	0	0	0	0	31	2
LOUIS CHAMPEAUX	0	0	31	0	0	0	0	0	31	0
KELVIN "RED" BAILEY	1	24	5	0	0	0	0	0	30	3
GEORGE KAZDIN	0	0	1	0	0	1	28	0	30	0
RONNIE RIDGEWAY	0	2	1	27	0	0	0	0	30	0
MIKE BENITEZ	1	27	1	0	0	0	0	0	29	1
CHARLES JOHNSON	0	0	0	21	0	3	0	5	29	0
OMAR ORRACA	2	20	7	0	0	0	0	0	29	1
JOHN COCHRANE	2	24	3	0	0	0	0	0	29	0
BUZZ SMART	0	0	0	0	3	25	1	0	29	0
RODDY HAYS	0	26	0	0	0	0	2	1	29	0
DIETMAR KOSSMANN	21	5	3	0	0	0	0	0	29	0
RICH HELLMUTH	25	1	1	0	0	2	0	0	29	0
MURRAY CUDWORTH	0	8	2	14	0	1	0	4	29	0
FRED PARSONS	9	13	5	0	1	0	0	0	28	0
DREW BROOKMAN	0	0	0	0	0	28	0	0	28	1
LOUIS J PUSKAS	1	0	6	14	6	1	0	0	28	0
MIKE ADKINS	11	0	16	0	0	0	0	0	27	5
CLYDE UPCHURCH	26	1	0	0	0	0	0	0	27	1
PAUL IVEY	4	7	16	0	0	0	0	0	27	0
PAUL MERCIER	26	1	0	0	0	0	0	0	27	0
JOE MOTTA	5	21	0	0	0	0	0	0	26	0
JOSEPH SPIKE HERBERT	1	22	2	0	0	0	0	0	25	0
RUSSELL YOUNG	0	19	6	0	0	0	0	0	25	0
B HUNTER	0	0	0	12	0	13	0	0	25	0
F E BUBBA GASTON	24	1	0	0	0	0	0	0	25	0
THOMAS MECHLIN	24	1	0	0	0	0	0	0	25	0
BURT MOSS	24	0	0	0	0	0	0	0	24	10
STEVE HAMILTON	23	0	0	0	0	0	0	0	23	0
BEN TRIBKEN	0	0	2	0	0	20	1	0	23	0
ROB DIXON	20	3	0	0	0	0	0	0	23	0
LUIS SUAREZ	7	4	12	0	0	0	0	0	23	0
KEVIN DILLON	5	13	4	0	0	0	0	0	22	3
RONALD/BRENT HOFMANN	0	0	11	0	0	11	0	0	22	1
JAY CHAMPLIN	22	0	0	0	0	0	0	0	22	0
PAT KELLY	0	0	20	0	1	0	0	0	21	1
ALLEN DE SILVA	0	0	0	0	0	21	0	0	21	0
DAVID PANTRY	0	0	0	0	0	21	0	0	21	9
MICHAEL CLARKIN	0	1	12	0	0	8	0	0	21	0
PATRICK NICOLE	20	0	0	0	0	0	0	0	20	0
MARTY SCANLON	0	0	3	13	0	3	0	1	20	0
DAN STEPHANO	0	0	5	0	0	14	1	0	20	0
CHARLES DONILON	0	0	0	0	12	8	0	0	20	0
MAURICE SCHAUB	0	0	4	15	0	0	0	1	20	0
CURT DEUEL	18	2	0	0	0	0	0	0	20	0
PAUL EVANS	0	2	14	0	0	3	0	0	19	0
KEITH R WINTER	0	0	0	0	0	19	0	0	19	5
DAVID REILLY	18	0	1	0	0	0	0	0	19	3
STEVE KAISER	2	3	14	0	0	0	0	0	19	4
BRIGHAM ENCK	0	1	5	12	0	1	0	0	19	0
TONY CATALFAMO	18	0	1	0	0	0	0	0	19	0
JOHN LANDRY	9	2	3	4	0	0	0	0	18	0
TONY TILLET	1	2	15	0	0	0	0	0	18	0
JOE KANE	18	0	0	0	0	0	0	0	18	0

Appendix 1. (Continued)

CAPTAIN	SPECIES								Total Tagged	Angler Tagged
	Sail-fish	Blue Marlin	White Marlin	Sword-fish	Bluefin Tuna	Yellow-fin	Albacore	Bigeye Tuna		
ABELARDO ARIZA	0	18	0	0	0	0	0	0	18	0
ROBERT HOLLINGER	16	0	2	0	0	0	0	0	18	0
PAUL PUSKAS	0	0	1	13	2	0	0	2	18	0
PETE BILDERBACK	0	0	0	4	4	4	0	6	18	0
DON CLARK	18	0	0	0	0	0	0	0	18	0
SHERWOOD GILL	0	18	0	0	0	0	0	0	18	1
ANTHONY VISENTIN	0	0	0	0	0	5	13	0	18	0
RICK ROSS	0	8	0	10	0	0	0	0	18	0
KLAUS SCHWARZKOPF	10	6	2	0	0	0	0	0	18	2
ALEX WIDMER	18	0	0	0	0	0	0	0	18	7
JOHN W CALDWELL	0	4	4	8	1	0	0	0	17	0
STEVE LEOPOLD	17	0	0	0	0	0	0	0	17	1
MARTY MORAN	0	0	12	0	5	0	0	0	17	0
JONATHAN NICHOLAS	0	16	0	1	0	0	0	0	17	0
JEFF GOSSWEILER	17	0	0	0	0	0	0	0	17	0
TOM BRODESSER	11	1	5	0	0	0	0	0	17	9
DONALD MERTEN	0	11	5	0	0	0	0	0	16	0
ARNALDO ANDRADE	0	13	3	0	0	0	0	0	16	0
MICHAEL WYDEN	16	0	0	0	0	0	0	0	16	2
RICHARD FIDES	0	0	0	12	0	1	3	0	16	0
MICHAEL LEECH	14	2	0	0	0	0	0	0	16	7
JEFF SYMONDS	0	0	0	15	0	1	0	0	16	0
O B VERNON O'BRYAN	0	15	1	0	0	0	0	0	16	0
SAM STOKES	2	5	9	0	0	0	0	0	16	1
SCOTT DRABINOWICZ	0	1	2	8	0	3	0	2	16	0
HAROLD HUBBELL	0	0	0	10	0	2	1	2	15	0
MARTIN KAPLAN	15	0	0	0	0	0	0	0	15	0
GEORGE HEHNER	0	0	0	0	9	6	0	0	15	3
JAMES T PEACHEY	5	5	5	0	0	0	0	0	15	0
JERRY POLACK	0	0	1	0	0	13	1	0	15	0
BRIAN PHILLIPS	7	4	4	0	0	0	0	0	15	0
THOMAS ZSAK	15	0	0	0	0	0	0	0	15	0
ALAN P GELFUSO	0	0	1	0	14	0	0	0	15	0
EVERETT BASSETT	15	0	0	0	0	0	0	0	15	0
PAUL TRUMPOWER	2	1	7	0	0	5	0	0	15	0
RICHARD DESMARAIS	0	0	0	0	15	0	0	0	15	2
ROBERT SANGSTER	0	0	0	0	7	7	0	0	14	1
GARY L SPERL	13	1	0	0	0	0	0	0	14	0
RICHARD QUIRK	14	0	0	0	0	0	0	0	14	0
NELSON BEIDEMAN	0	1	4	4	0	0	0	5	14	0
ALLY MERCIER	0	1	1	12	0	0	0	0	14	0
ERIC BLANKS	0	4	7	0	0	3	0	0	14	0
KEITH LEONARD	0	12	2	0	0	0	0	0	14	0
RICKY MCDUFFIE	0	10	4	0	0	0	0	0	14	0
CRAIG ZIEGLER	4	2	8	0	0	0	0	0	14	0
HOWARD BASNIGHT	1	2	0	0	11	0	0	0	14	1
DAVID FAHEY	14	0	0	0	0	0	0	0	14	1
SPIKE HERBERT	0	10	4	0	0	0	0	0	14	0
PAUL DAISEY	0	0	14	0	0	0	0	0	14	0
TED D'ESPOSITO	14	0	0	0	0	0	0	0	14	0
RICK GAURON	0	0	0	0	13	0	0	0	13	0
EDDIE WINDES	5	5	3	0	0	0	0	0	13	1
DALE MECKLER	13	0	0	0	0	0	0	0	13	1
JEFF ROSS	0	2	11	0	0	0	0	0	13	0
BOYD MOTHE	0	6	0	0	0	7	0	0	13	0
DANNY BOLAND	0	12	1	0	0	0	0	0	13	2
SOCKO GORENFLO	13	0	0	0	0	0	0	0	13	0
MARIO V LAO	1	12	0	0	0	0	0	0	13	0
NEYER BERNARD	0	0	13	0	0	0	0	0	13	3
CHICK SCHLOSS	0	2	0	4	0	0	0	6	12	0
THOMAS W DULKA	0	0	1	0	0	11	0	0	12	1
ROBERT S MURRAY	0	0	0	0	12	0	0	0	12	2
RICH EGERTON	0	1	10	0	0	1	0	0	12	0
DEW FORBES	5	5	2	0	0	0	0	0	12	0
SCOTT WALKER	1	10	1	0	0	0	0	0	12	0
JOHN HANKS	2	3	3	3	0	1	0	0	12	0
BOB COLLINS	5	6	1	0	0	0	0	0	12	2
TY BRAGG	2	4	3	0	0	3	0	0	12	0
TOM BYRNE	0	0	12	0	0	0	0	0	12	1

Appendix 1. (Continued)

CAPTAIN	SPECIES								Total Tagged	Angler Tagged
	Sail-fish	Blue Marlin	White Marlin	Sword-fish	Bluefin Tuna	Yellow-fin	Alba-core	Bigeye Tuna		
TAD BUSSEY	11	0	1	0	0	0	0	0	12	6
DENNIS FORGIONE	12	0	0	0	0	0	0	0	12	0
JOHN R HOPWOOD	12	0	0	0	0	0	0	0	12	0
JIM MUHS	12	0	0	0	0	0	0	0	12	0
SCOTT LANEY	9	2	1	0	0	0	0	0	12	1
DICK HARRIS	0	1	11	0	0	0	0	0	12	0
RON GREEN	12	0	0	0	0	0	0	0	12	0
ED HADLEY	11	1	0	0	0	0	0	0	12	0
ANDRE FORTIN	11	0	1	0	0	0	0	0	12	0
CHARLES SHELTON	3	5	1	0	0	3	0	0	12	0
LEONARD INGRANDE	0	0	0	0	0	12	0	0	12	0
A C MILLER	12	0	0	0	0	0	0	0	12	1
TIMOTHY B LECKY	0	1	11	0	0	0	0	0	12	0
ALBERT CONTI	0	2	0	0	9	0	0	0	11	2
U CHITO	10	1	0	0	0	0	0	0	11	0
ROBERT E ROWAN	0	0	0	0	10	1	0	0	11	0
JACK REECE	0	8	3	0	0	0	0	0	11	0
JACK PLACHTER	11	0	0	0	0	0	0	0	11	0
EDWARD BERGER	1	2	3	0	5	0	0	0	11	0
MIKE CANINO	1	6	4	0	0	0	0	0	11	0
J. POLACK	0	0	0	0	0	9	2	0	11	0
AL PETROSKY	0	10	1	0	0	0	0	0	11	0
REX HEWITT	6	2	3	0	0	0	0	0	11	0
CHIP SOULEK	7	4	0	0	0	0	0	0	11	0
HARRY GRAVES	4	7	0	0	0	0	0	0	11	0
TOM CARBO	1	6	1	0	0	3	0	0	11	0
JOHN ROWE	0	1	0	0	8	0	1	0	10	0
HECTOR R FLORES	0	9	1	0	0	0	0	0	10	0
JOHN NIXON	0	0	0	10	0	0	0	0	10	0
JOE RENDA	10	0	0	0	0	0	0	0	10	1
DENNIS MERTEN	7	0	3	0	0	0	0	0	10	1
DORSEY "CUZ" PROTHMAN	8	2	0	0	0	0	0	0	10	0
JEFF CRANSHAW	9	0	1	0	0	0	0	0	10	0
JASON DUCKWORTH	0	0	0	5	0	3	0	2	10	0
MIKE FRENETTE	0	2	1	0	0	7	0	0	10	0
JEFF SESSA	10	0	0	0	0	0	0	0	10	7
FRANK GODWIN	1	8	1	0	0	0	0	0	10	0
SKIP BRIDGER	10	0	0	0	0	0	0	0	10	0
WILLIAM KIELDSEN	8	1	1	0	0	0	0	0	10	0
JOHN MAGURSKY	7	3	0	0	0	0	0	0	10	0
FRANK GRIFFIN	0	10	0	0	0	0	0	0	10	0
BILL HARTMAN	7	3	0	0	0	0	0	0	10	0
JIMMY BAYNE	0	1	6	0	0	3	0	0	10	1
ANDY WING	0	0	5	0	0	5	0	0	10	0
CHARLIE ROACH	10	0	0	0	0	0	0	0	10	0
RICHARD FIFER	0	7	3	0	0	0	0	0	10	0
KLEO BLUE	0	7	3	0	0	0	0	0	10	0
RICHARD NESSEL	0	0	5	2	1	2	0	0	10	0
LEON JAMES	1	3	1	0	0	5	0	0	10	0
WILLIAM MCALLISTER	0	2	8	0	0	0	0	0	10	7
GARY CRAIG	10	0	0	0	0	0	0	0	10	0
HENRY OTTO	10	0	0	0	0	0	0	0	10	0
RON MITCHEM	10	0	0	0	0	0	0	0	10	4

Appendix 2. Anglers who made outstanding contributions to the CTC in 1992 by assisting in the tagging of 11 or more sailfish, blue marlin, white marlin, swordfish, bluefin tuna, yellowfin tuna, albacore tuna and bigeye tuna. The "Captain Tagged" column signifies fish tagged by anglers while fishing as captains--these fish are included in the total.

ANGLER	SPECIES								Total Tagged	Captain Tagged
	Sail-fish	Blue Marlin	White Marlin	Sword-fish	Bluefin Tuna	Yellow-fin	Alba-core	Bigeye Tuna		
STANLEY KLIMEK	9	9	12	0	0	236	0	0	266	0
EVERETT PETRONIO	0	0	1	0	38	44	0	0	83	16
JOHN S HUNDLEY	63	3	1	0	0	0	0	0	67	0
JACK MILLER	61	0	0	0	0	0	0	0	61	0
J RICHARD JECK	42	3	0	0	0	0	0	0	45	5
JIM MURRAY	35	4	5	0	0	0	0	0	44	1
RICH REAGAN	0	0	0	0	26	15	0	0	41	0
SARA DEVINE	5	3	32	0	0	0	0	0	40	0
FRED DAVID	36	0	0	0	0	0	0	0	36	6
MEL IMMERGUT	0	0	0	0	4	22	8	0	34	0
JIM EDMISTON	5	27	1	0	0	1	0	0	34	2
BUDDY SCHULTZ	28	1	2	0	0	0	0	0	31	0
CAROLE SPEICHER	22	0	7	0	0	0	0	0	29	0
ROBERT E CASSIDY	0	0	0	0	0	16	12	0	28	11
DAVID BREGMAN	0	0	1	0	3	21	3	0	28	1
TERESA HUTCHINS	24	0	4	0	0	0	0	0	28	0
LEE PEPIN	0	0	1	0	26	0	0	0	27	16
T V WOOD	9	0	3	0	0	15	0	0	27	0
PAUL O'DONNELL	2	12	10	2	0	0	0	0	26	0
LINDA NOLL	25	0	0	0	0	0	0	0	25	0
PAUL D MOTTA	7	16	0	0	0	0	0	0	23	2
DAVID G WAIN	23	0	0	0	0	0	0	0	23	0
DOUG GRECO	0	0	7	8	2	1	0	3	21	3
PAUL VISENTIN	0	0	0	0	0	8	13	0	21	0
DAVID W MOFFAT	0	0	1	7	4	8	0	0	20	16
JOHN BASSETT	20	0	0	0	0	0	0	0	20	1
ROBERT D SHORE	19	0	0	0	0	0	0	0	19	0
STEPHEN R HUTCHINS	15	0	4	0	0	0	0	0	19	1
MIKE WELTER	19	0	0	0	0	0	0	0	19	0
GILDA PAVINI	0	0	19	0	0	0	0	0	19	0
RICHARD LYTTLE	17	1	0	0	0	0	0	0	18	0
TIM KEENEY	0	0	0	0	8	9	0	0	17	0
LUIS L BACARDI	6	10	1	0	0	0	0	0	17	0
CHRIS GOOCH	12	1	3	0	0	0	0	0	16	0
AARON CROSWAIT	0	0	0	0	0	15	0	0	15	0
HAL GOOCH	13	0	2	0	0	0	0	0	15	0
GRANT L BERG	0	0	0	0	8	6	0	0	14	0
GREG MCCAULEY	14	0	0	0	0	0	0	0	14	0
MATT BROOKMAN	0	0	0	0	0	14	0	0	14	0
CURTIS JOSEY	11	0	3	0	0	0	0	0	14	0
SMYTH MCKISSICK	13	0	0	0	0	0	0	0	13	0
JOHN DAVENPORT	13	0	0	0	0	0	0	0	13	0
AILSA SCHWARZKOPF	5	6	2	0	0	0	0	0	13	6
DAVID MOSS	8	1	2	0	0	1	0	0	12	0
ANNA ELZ	0	1	2	9	0	0	0	0	12	0
BERNARD BALLOU	0	0	1	0	11	0	0	0	12	0
OLIVER MIREUR	1	1	10	0	0	0	0	0	12	0
RANDALL/SUE L WARD	3	0	9	0	0	0	0	0	12	0
D ERICKSON	1	0	0	1	0	10	0	0	12	0
PAT KELLY	0	0	10	0	0	1	0	0	11	6
JACK OSBORNE	11	0	0	0	0	0	0	0	11	0
BEN QUEVEDO	11	0	0	0	0	0	0	0	11	0
STANLEY KLEMEK	3	2	1	0	0	5	0	0	11	0
SUSAN GOOCH	8	0	3	0	0	0	0	0	11	0
SKIP NOELKER	11	0	0	0	0	0	0	0	11	0
E BRONSON INGRAM	9	2	0	0	0	0	0	0	11	0
DANNY CASEBERE	0	0	0	0	0	10	0	0	10	0
BETH ANNE	0	0	1	1	0	8	0	0	10	0
HARRY SMART	0	0	0	0	0	9	1	0	10	0
WILLIAM SISSON	0	0	0	0	8	2	0	0	10	0
DICK WEBER	9	0	1	0	0	0	0	0	10	0
DEAN JACKSON	10	0	0	0	0	0	0	0	10	4
DOUG GARRITY	10	0	0	0	0	0	0	0	10	0
JOSE PUIG	0	10	0	0	0	0	0	0	10	1
HOWARD BLITSTEIN	10	0	0	0	0	0	0	0	10	0
E RALPH ENGLISH	5	0	3	0	0	2	0	0	10	0
JUAN RAFFO	7	3	0	0	0	0	0	0	10	0

Appendix 2. (Continued)

ANGLER	SPECIES								Total Tagged	Captain Tagged
	Sail- fish	Blue Marlin	White Marlin	Sword- fish	Bluefin Tuna	Yellow- fin	Alba- core	Bigeye Tuna		
JAY/SHARON S BERMAN	0	0	0	0	0	10	0	0	10	10
STEPHAN ENGLISH	6	0	1	0	0	3	0	0	10	0